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Brunsting et al.

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(54) **METHOD AND APPARATUS FOR SECURE VENDOR ACCESS TO ACCOUNTS PAYABLE INFORMATION OVER THE INTERNET**

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(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) Filed: **Sep. 19, 1997**

(51) **Int. Cl.**[7] **G06F 17/60**
(52) **U.S. Cl.** **705/1**; 705/40
(58) **Field of Search** 705/17, 18, 21, 705/1, 40, 54, 52; 707/10; 713/190, 202, 200; 235/379; 380/30

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Wilson, Tim; "A Way to Webify Legacy Data", Sep. 15, 1997; InternetWeek, p. 1 DialogWeb copy pp. 1–3.*

* cited by examiner

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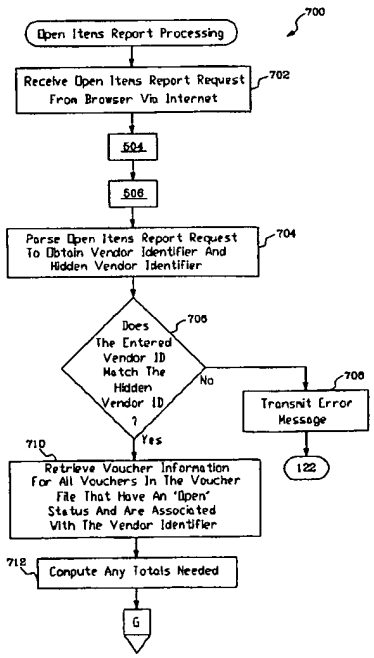
(57) **ABSTRACT**

Improved techniques for remotely accessing account information through the Internet are disclosed. The remote access techniques provide security measures so that unauthorized access is unlikely even though the Internet is utilized. Assuming access is authorized, the requested account information can be acquired and then presented to a requester via the Internet in a format suitable for the type of the requested account information. In addition, as an additional security measure, the invention may also filter out any account holder identifying information from the requested account information such that the account information presented to the requester does not identify the account holder.

3 Claims, 25 Drawing Sheets



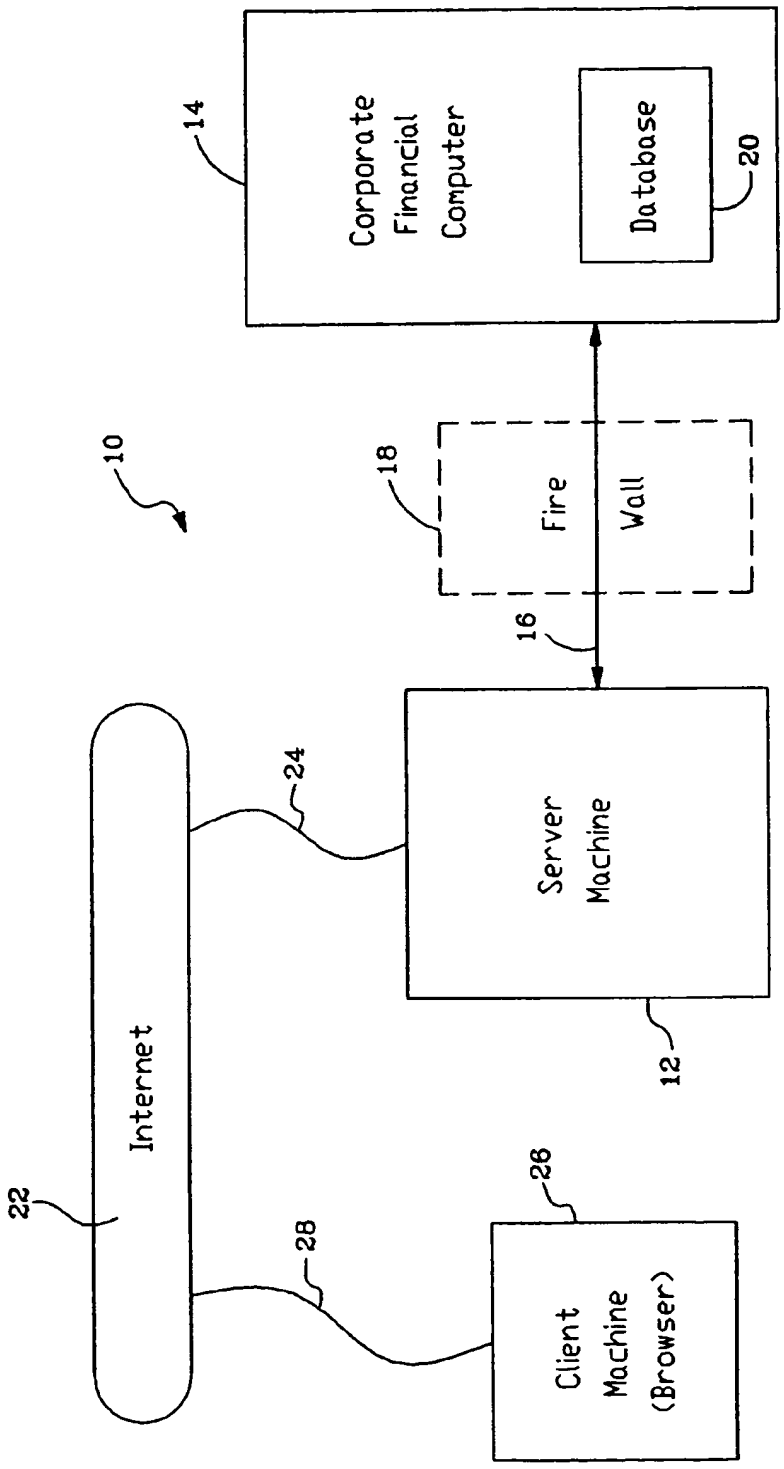

Corporate Financial Computer
14
Database
20
10
18
Fire Wall
16
Server Machine
12
24
Internet
22
28
26
Client Machine (Browser)

FIG.1A

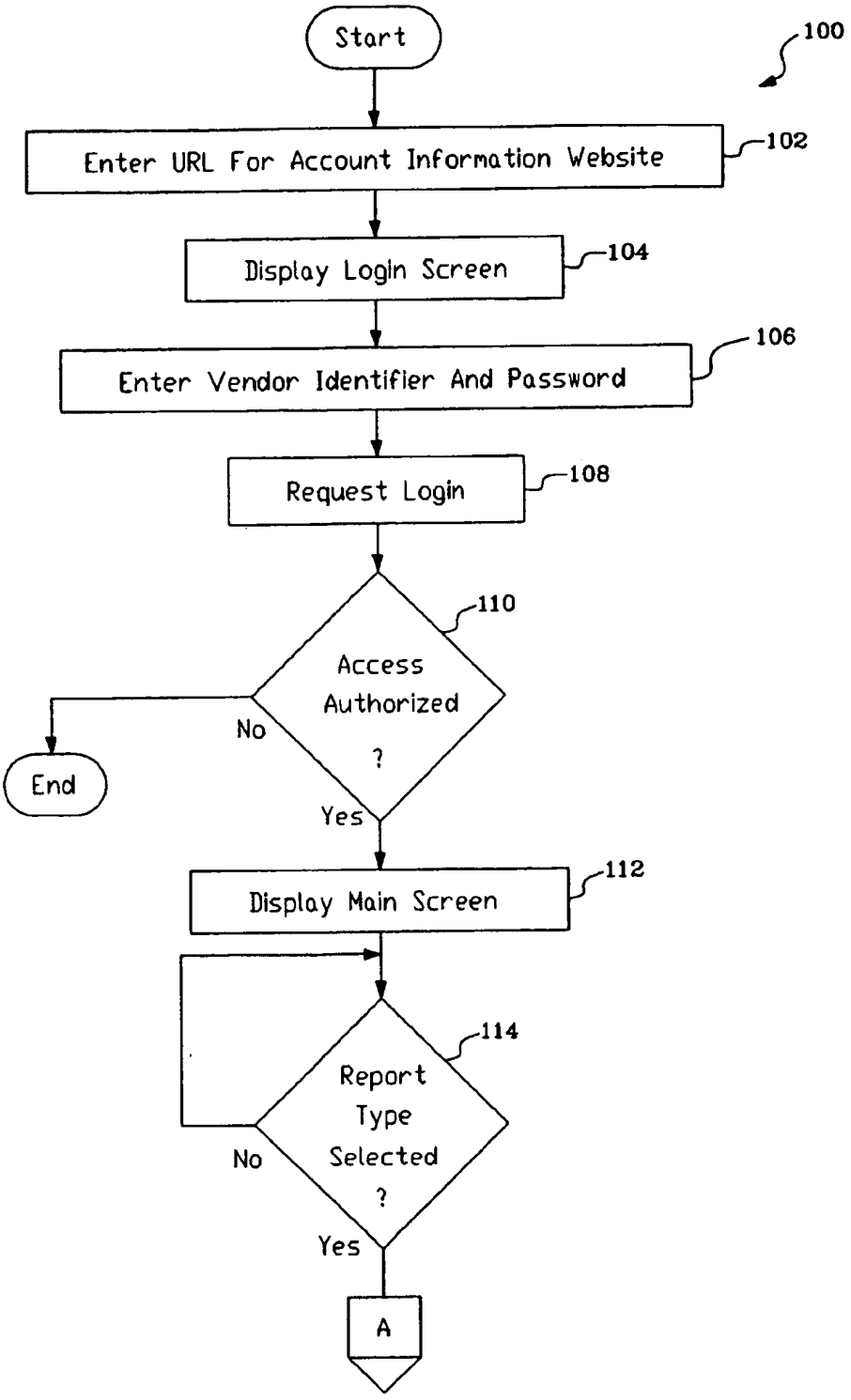

Start
100
Enter URL For Account Information Website
102
Display Login Screen
104
Enter Vendor Identifier And Password
106
Request Login
108
Access Authorized ?
110
No
End
Yes
Display Main Screen
112
Report Type Selected ?
114
No
Yes
A

FIG.1B

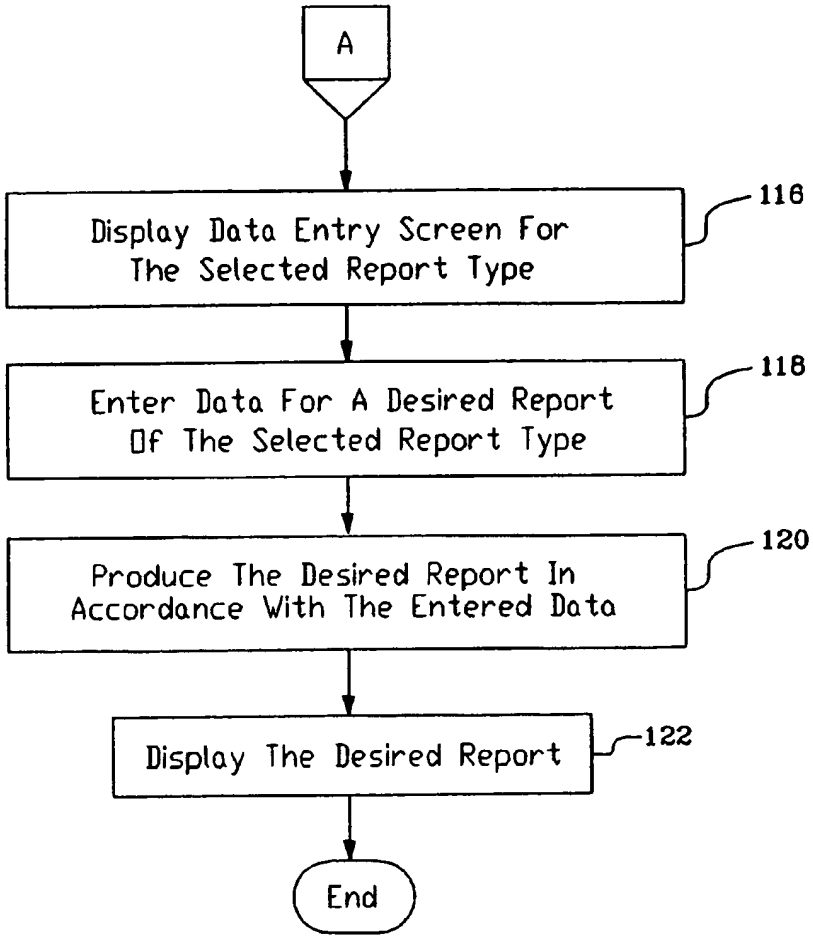

A
Display Data Entry Screen For The Selected Report Type
116
Enter Data For A Desired Report Of The Selected Report Type
118
Produce The Desired Report In Accordance With The Entered Data
120
Display The Desired Report
122
End

FIG.1C

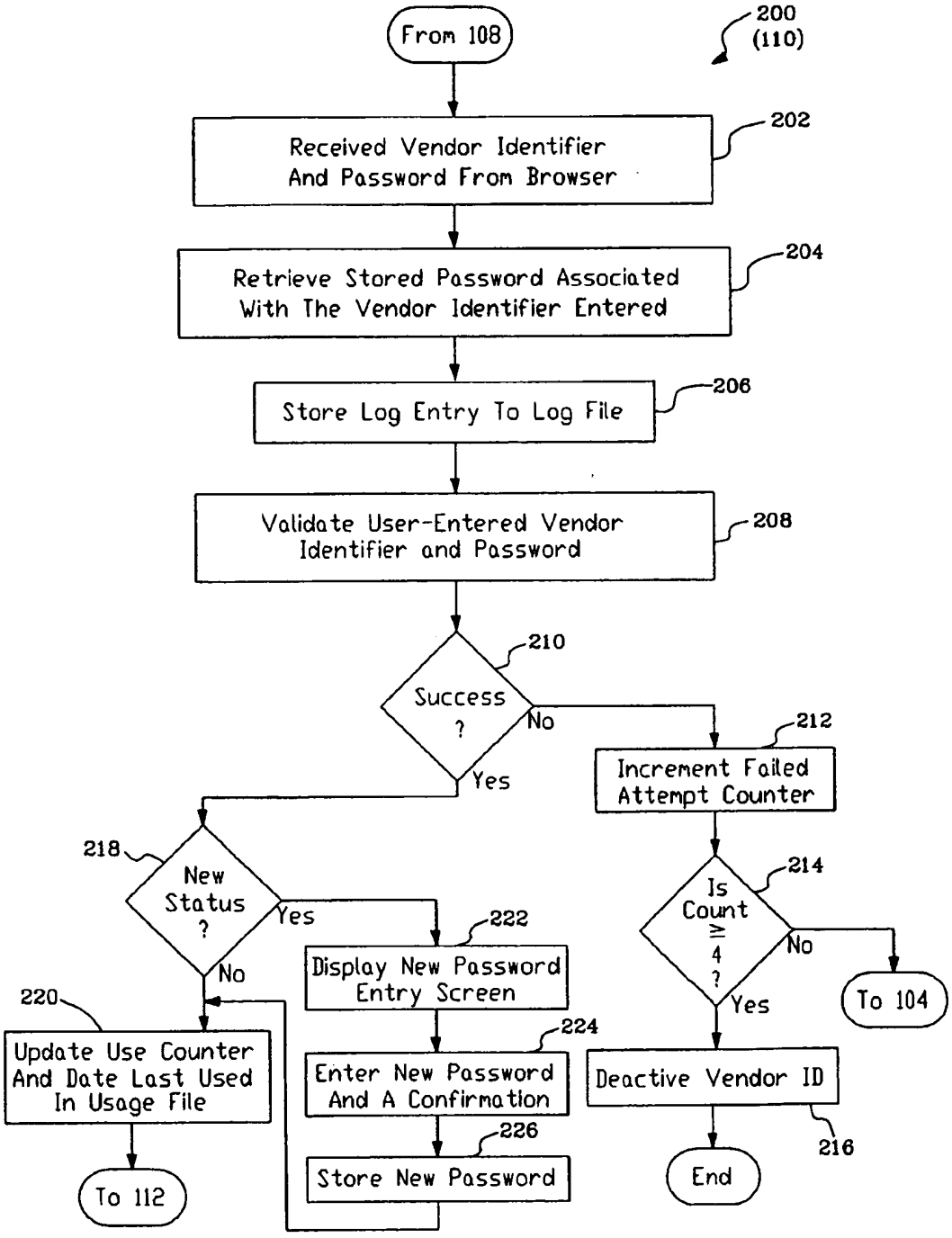

From 108
200
(110)
Received Vendor Identifier And Password From Browser
202
Retrieve Stored Password Associated With The Vendor Identifier Entered
204
Store Log Entry To Log File
206
Validate User-Entered Vendor Identifier and Password
208
Success ?
210
No
Yes
Increment Failed Attempt Counter
212
Is Count ≥ 4 ?
214
No
Yes
To 104
Deactive Vendor ID
216
End
New Status ?
218
Yes
No
Display New Password Entry Screen
222
Enter New Password And A Confirmation
224
Store New Password
226
Update Use Counter And Date Last Used In Usage File
220
To 112

FIG.2

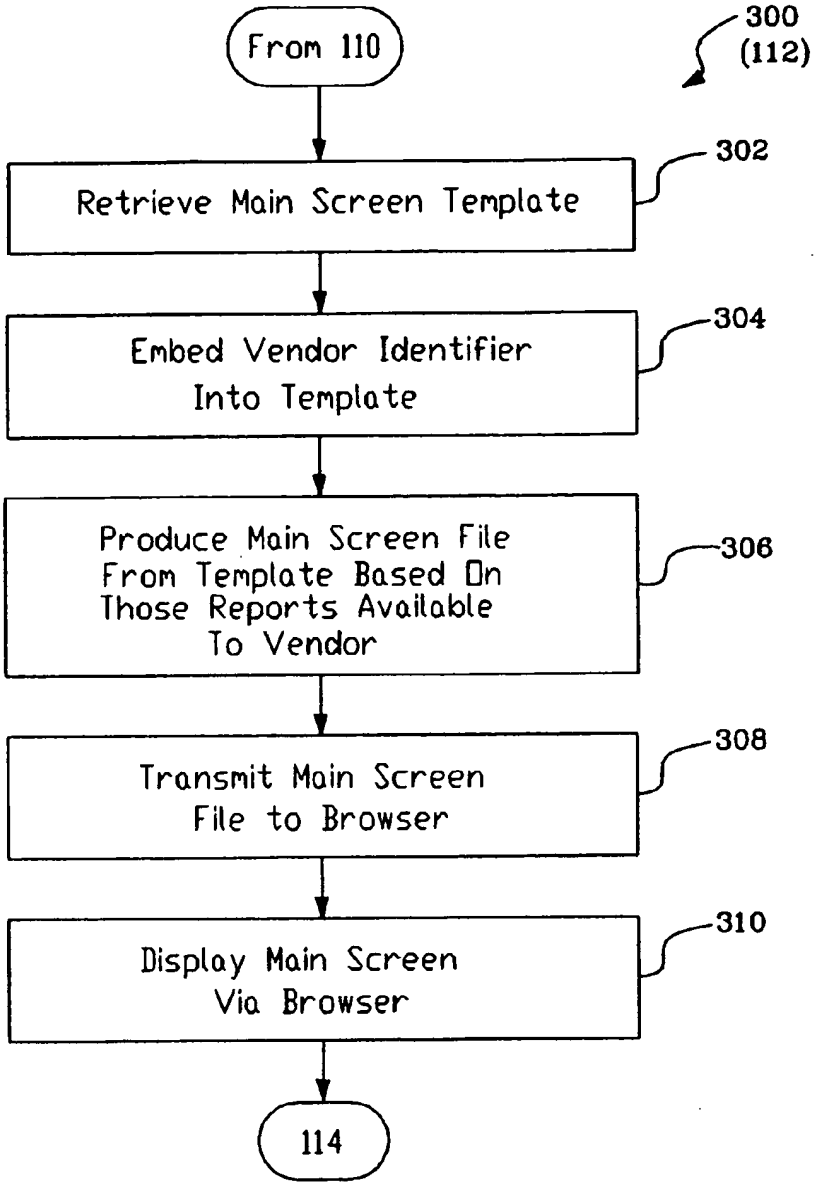

From 110
300
(112)
Retrieve Main Screen Template
302
Embed Vendor Identifier Into Template
304
Produce Main Screen File From Template Based On Those Reports Available To Vendor
306
Transmit Main Screen File to Browser
308
Display Main Screen Via Browser
310
114

FIG.3

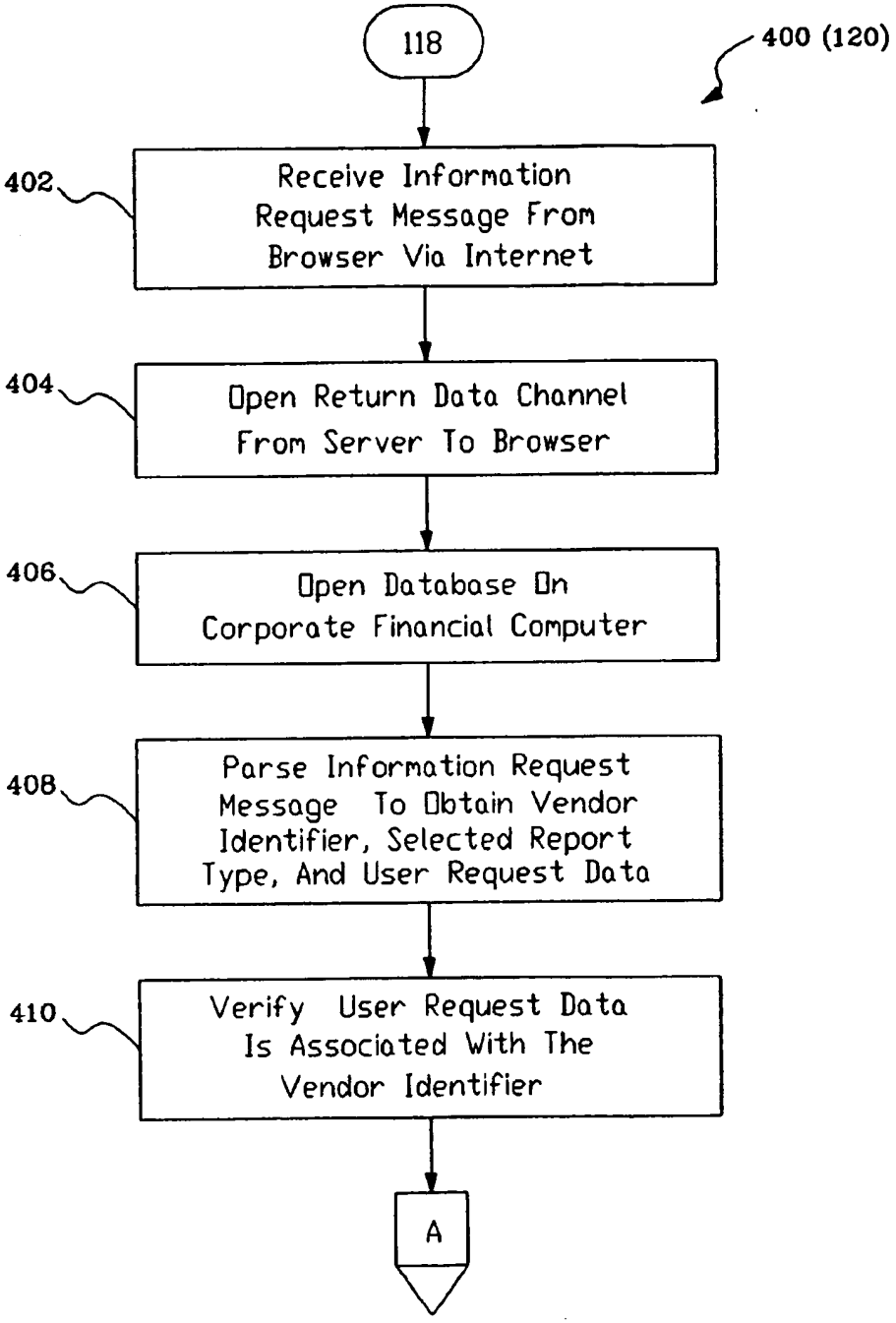

118
400 (120)
402
Receive Information Request Message From Browser Via Internet
404
Open Return Data Channel From Server To Browser
406
Open Database On Corporate Financial Computer
408
Parse Information Request Message To Obtain Vendor Identifier, Selected Report Type, And User Request Data
410
Verify User Request Data Is Associated With The Vendor Identifier
A

FIG.4A

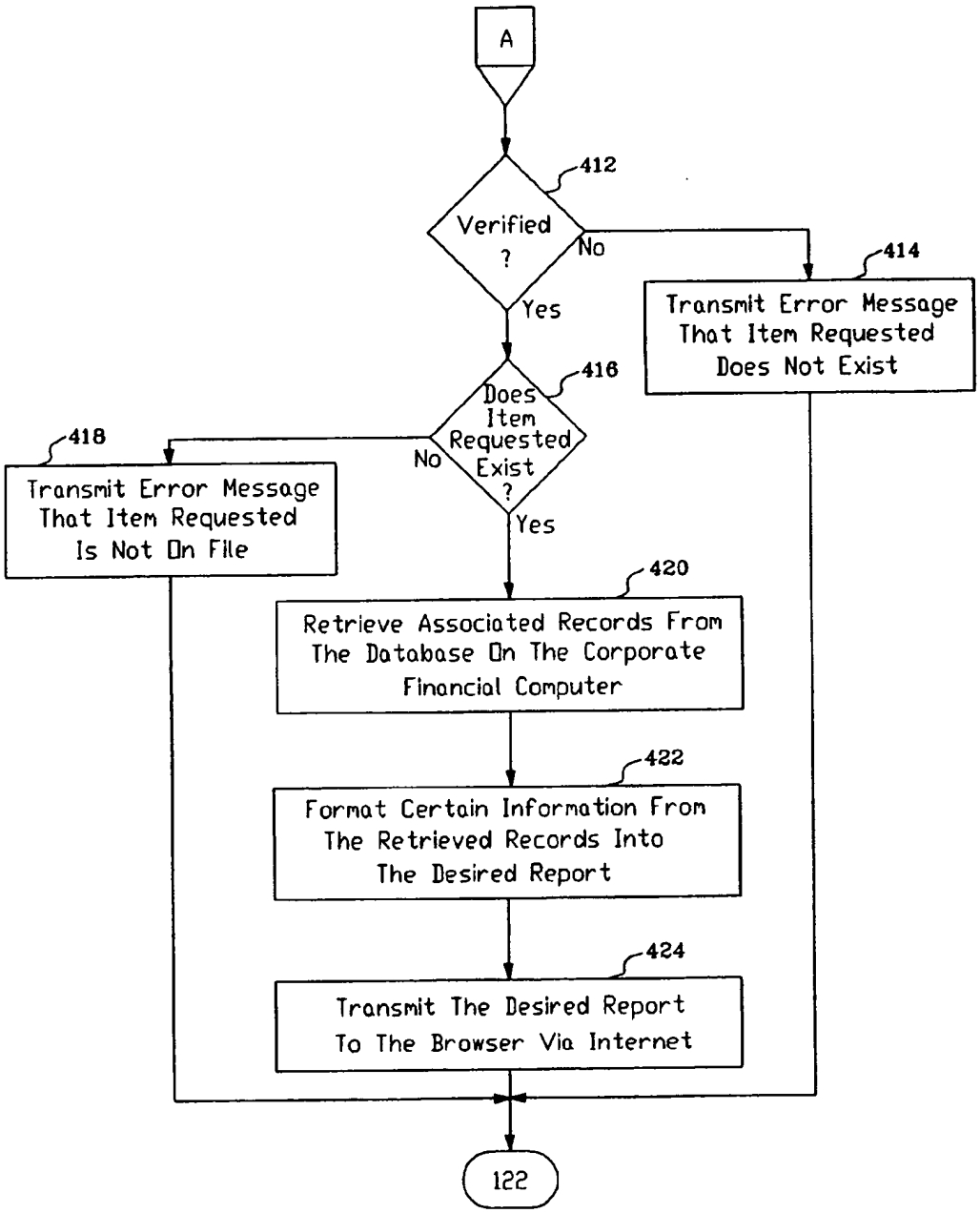

A
412
Verified ?
No
Yes
414
Transmit Error Message That Item Requested Does Not Exist
416
Does Item Requested Exist ?
No
Yes
418
Transmit Error Message That Item Requested Is Not On File
420
Retrieve Associated Records From The Database On The Corporate Financial Computer
422
Format Certain Information From The Retrieved Records Into The Desired Report
424
Transmit The Desired Report To The Browser Via Internet
122

FIG.4B

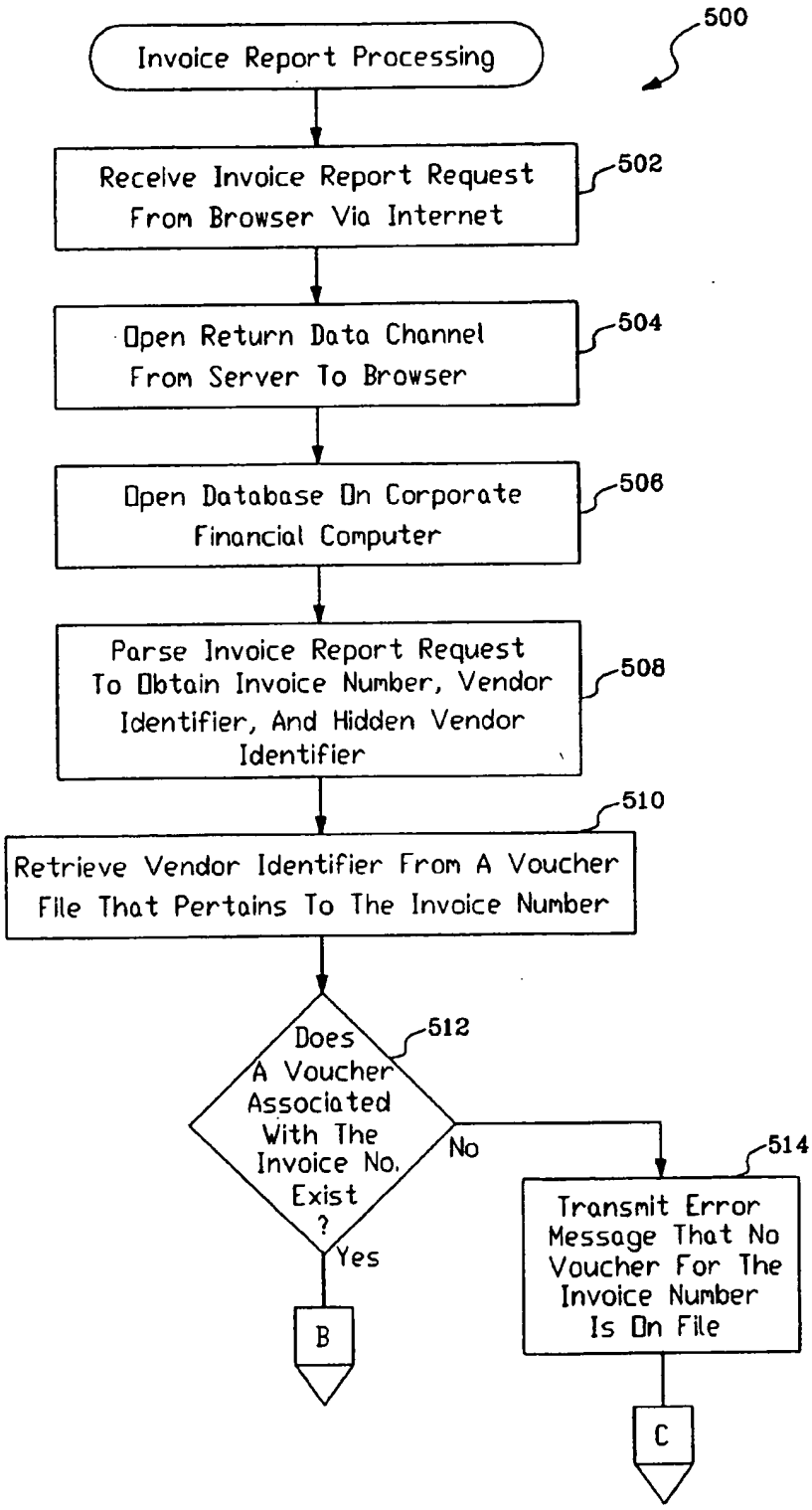

Invoice Report Processing
500
Receive Invoice Report Request From Browser Via Internet
502
Open Return Data Channel From Server To Browser
504
Open Database On Corporate Financial Computer
506
Parse Invoice Report Request To Obtain Invoice Number, Vendor Identifier, And Hidden Vendor Identifier
508
Retrieve Vendor Identifier From A Voucher File That Pertains To The Invoice Number
510
Does A Voucher Associated With The Invoice No. Exist ?
512
No
Yes
Transmit Error Message That No Voucher For The Invoice Number Is On File
514
B
C

FIG.5A

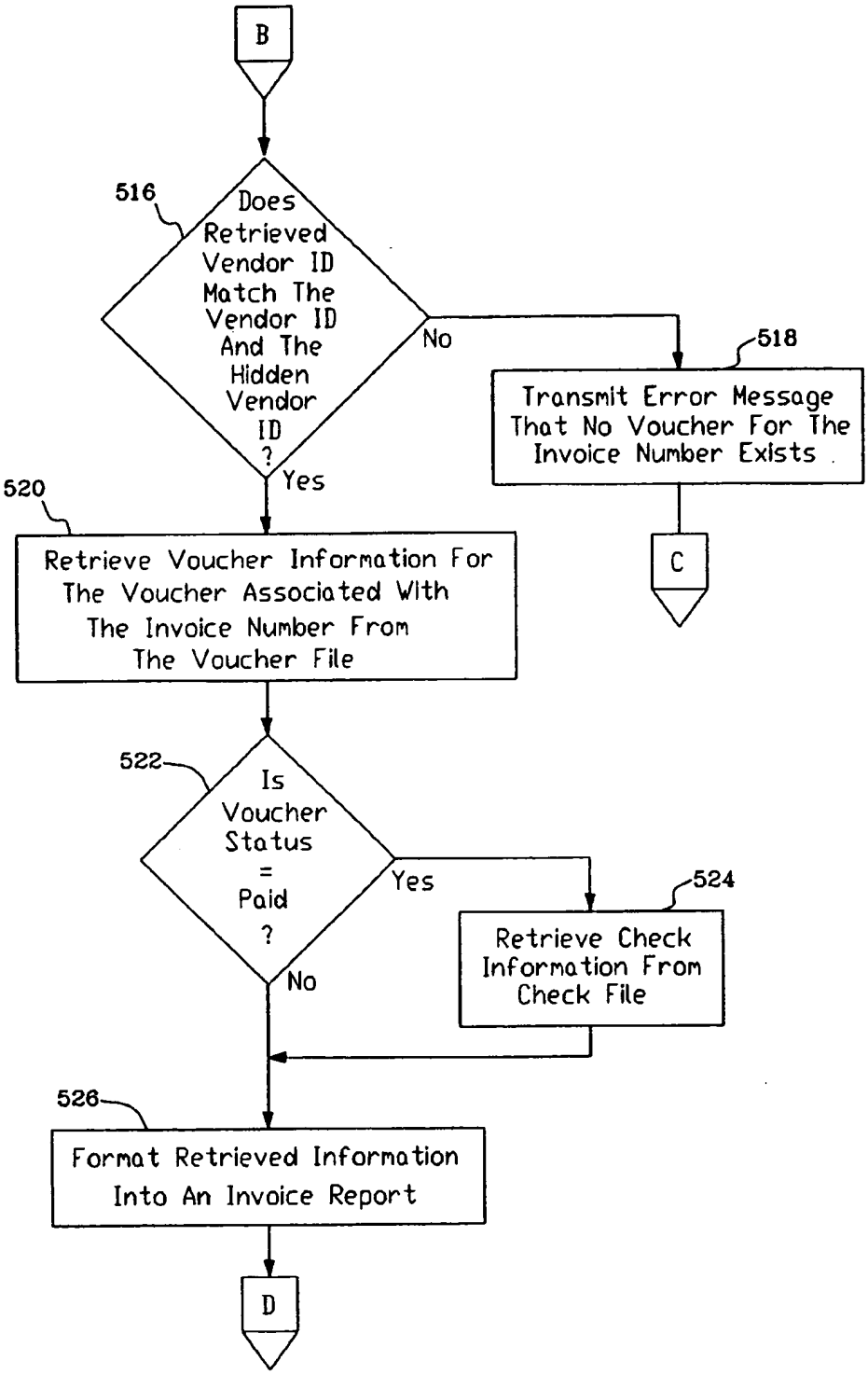

B
516
Does Retrieved Vendor ID Match The Vendor ID And The Hidden Vendor ID ?
No
518
Transmit Error Message That No Voucher For The Invoice Number Exists
C
Yes
520
Retrieve Voucher Information For The Voucher Associated With The Invoice Number From The Voucher File
522
Is Voucher Status = Paid ?
Yes
524
Retrieve Check Information From Check File
No
526
Format Retrieved Information Into An Invoice Report
D

FIG.5B

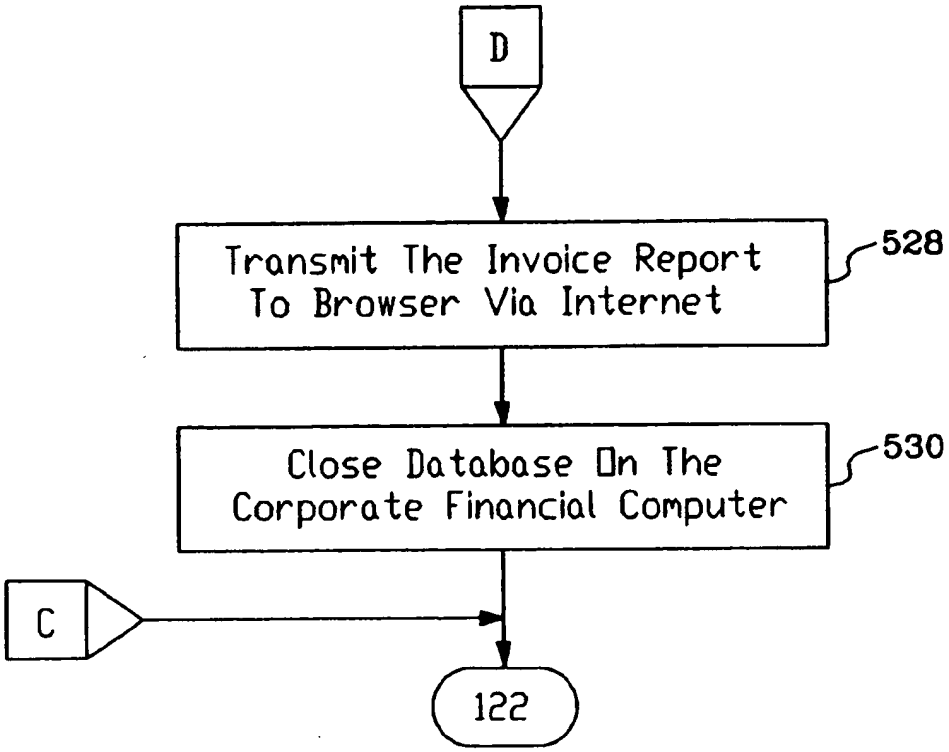

D
Transmit The Invoice Report To Browser Via Internet
528
Close Database On The Corporate Financial Computer
530
C
122

FIG.5C

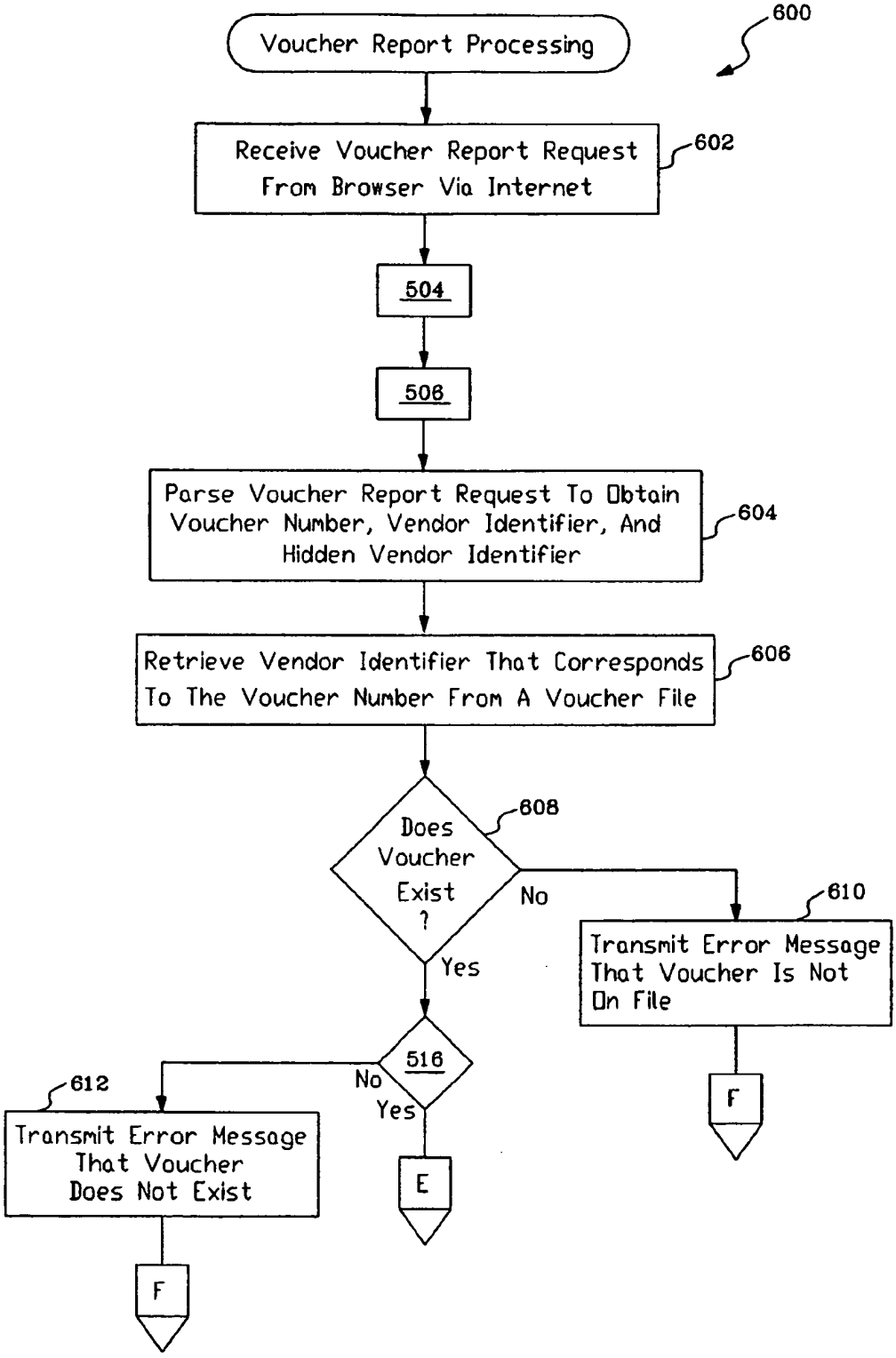

Voucher Report Processing
600
Receive Voucher Report Request From Browser Via Internet
602
504
506
Parse Voucher Report Request To Obtain Voucher Number, Vendor Identifier, And Hidden Vendor Identifier
604
Retrieve Vendor Identifier That Corresponds To The Voucher Number From A Voucher File
606
Does Voucher Exist ?
608
No
Yes
Transmit Error Message That Voucher Is Not On File
610
F
516
No
Yes
612
Transmit Error Message That Voucher Does Not Exist
E
F

FIG.6A

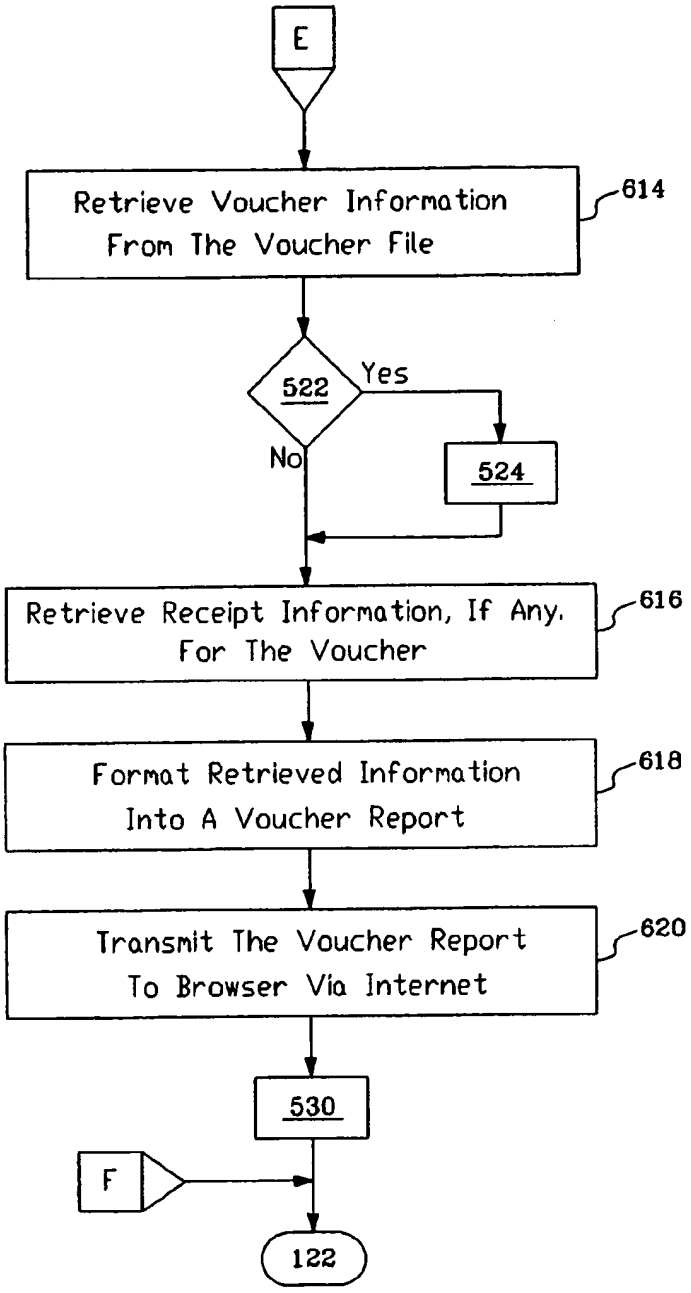

E
Retrieve Voucher Information From The Voucher File
614
522
Yes
No
524
Retrieve Receipt Information, If Any, For The Voucher
616
Format Retrieved Information Into A Voucher Report
618
Transmit The Voucher Report To Browser Via Internet
620
530
F
122

FIG.6B

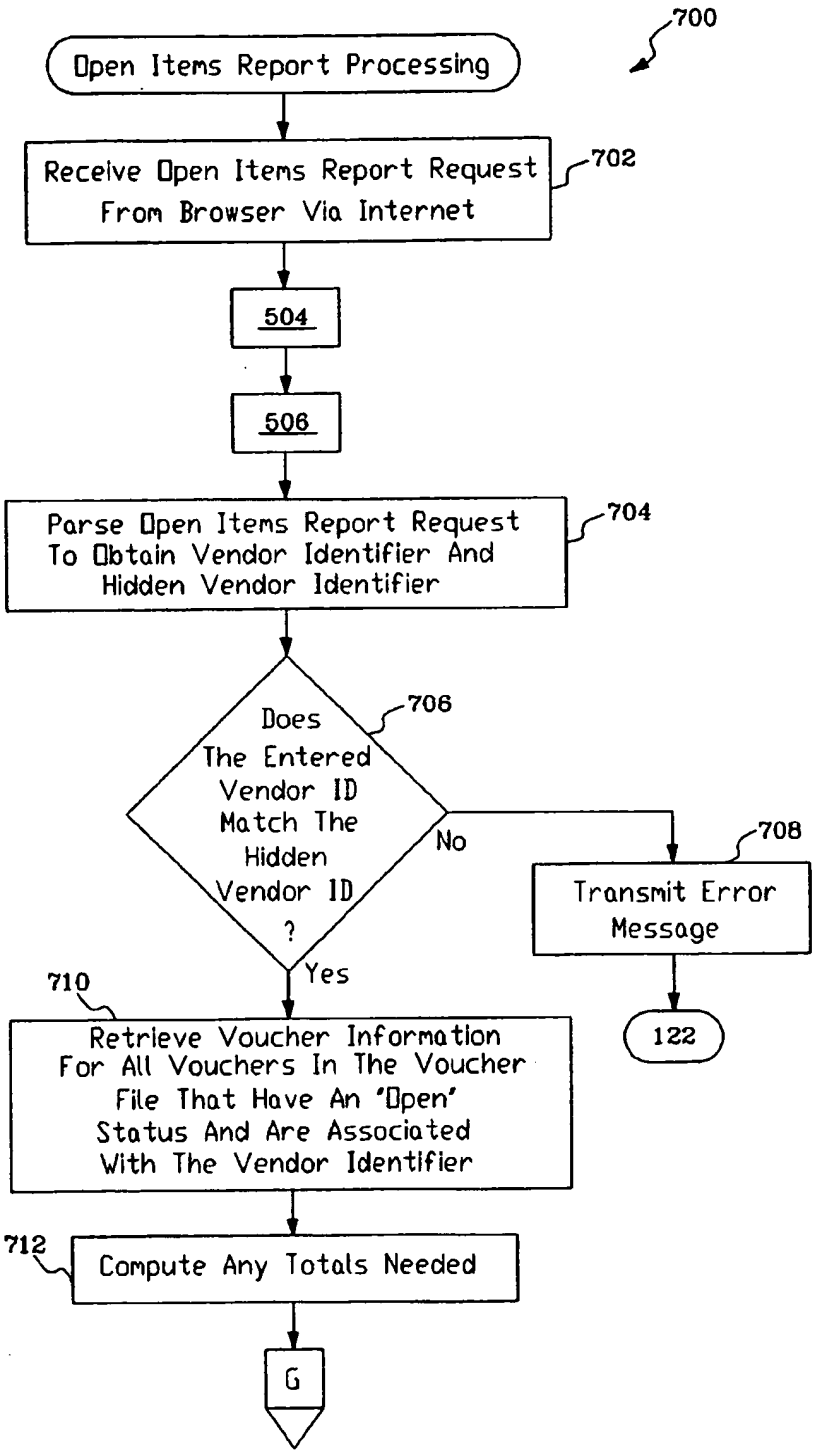

700
Open Items Report Processing
Receive Open Items Report Request From Browser Via Internet
702
504
506
Parse Open Items Report Request To Obtain Vendor Identifier And Hidden Vendor Identifier
704
Does The Entered Vendor ID Match The Hidden Vendor ID ?
706
No
Yes
708
Transmit Error Message
122
710
Retrieve Voucher Information For All Vouchers In The Voucher File That Have An 'Open' Status And Are Associated With The Vendor Identifier
712
Compute Any Totals Needed
G

FIG.7A

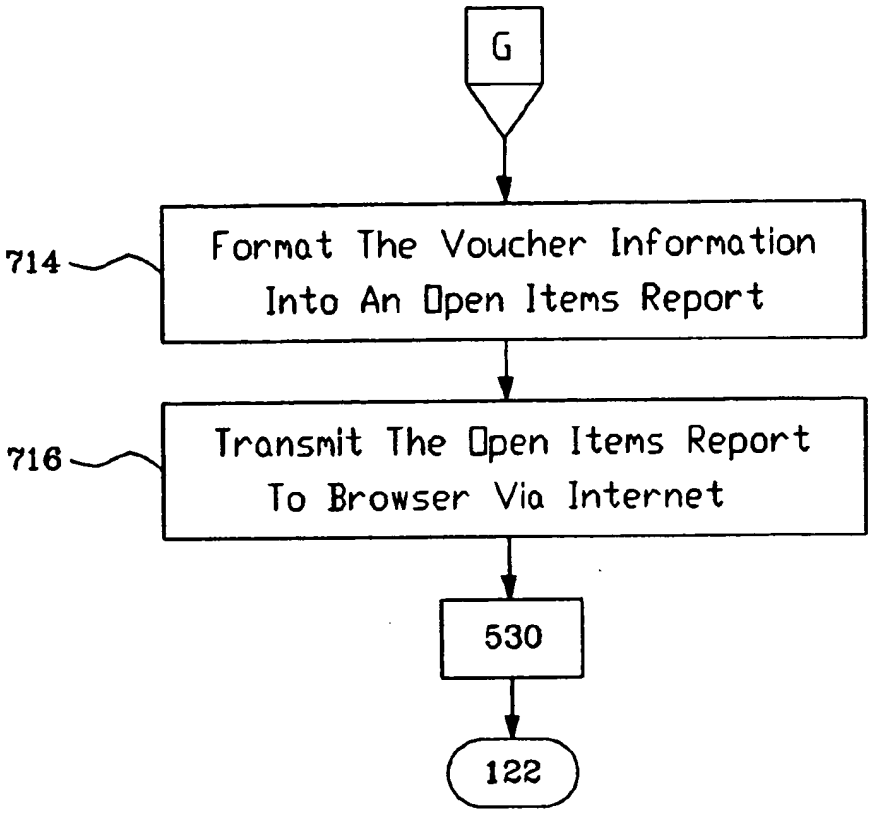

G
714
Format The Voucher Information Into An Open Items Report
716
Transmit The Open Items Report To Browser Via Internet
530
122

FIG.7B

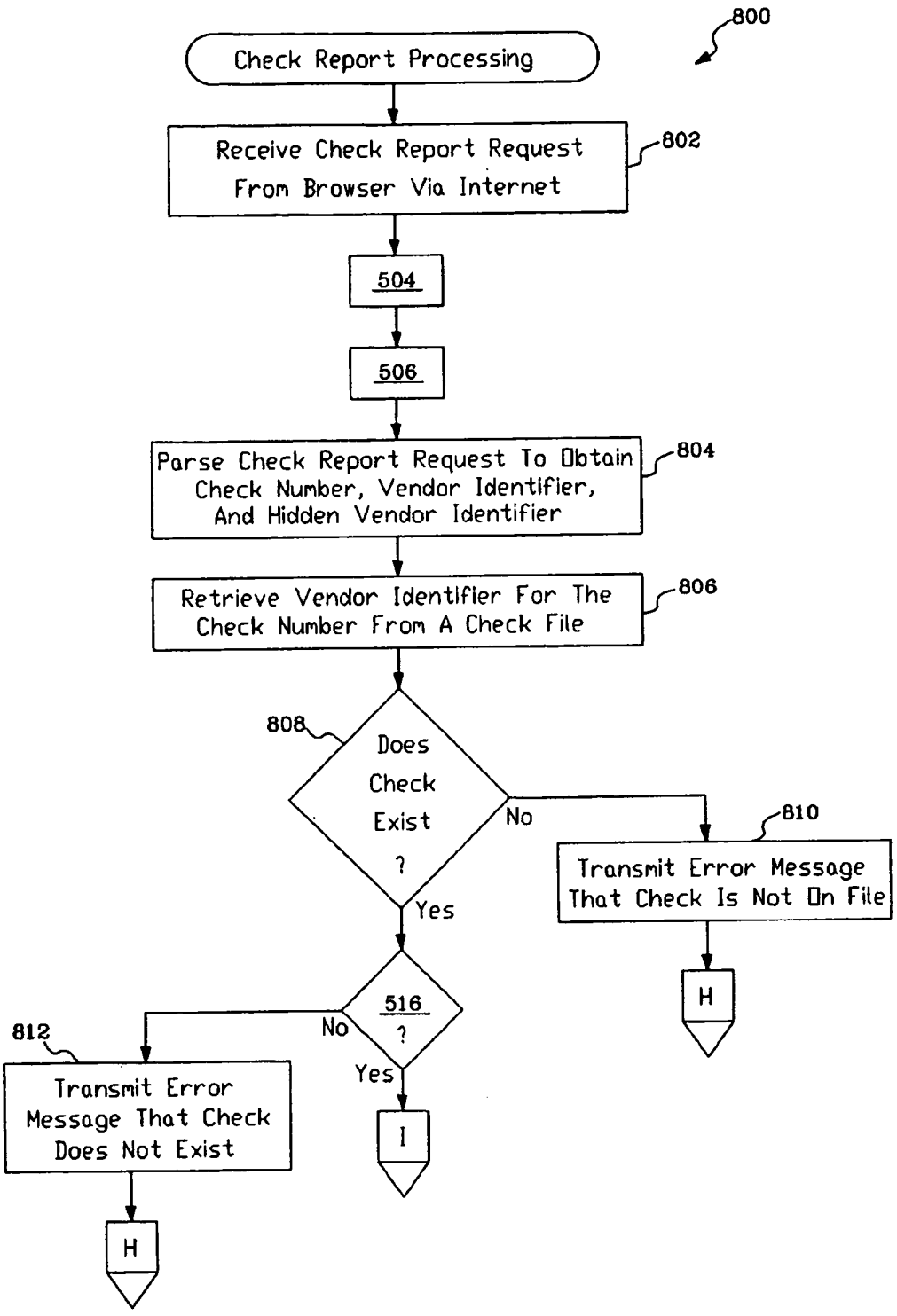

800
Check Report Processing
Receive Check Report Request From Browser Via Internet
802
504
506
Parse Check Report Request To Obtain Check Number, Vendor Identifier, And Hidden Vendor Identifier
804
Retrieve Vendor Identifier For The Check Number From A Check File
806
808
Does Check Exist ?
No
Yes
810
Transmit Error Message That Check Is Not On File
H
516 ?
No
Yes
812
Transmit Error Message That Check Does Not Exist
H
I

FIG.8A

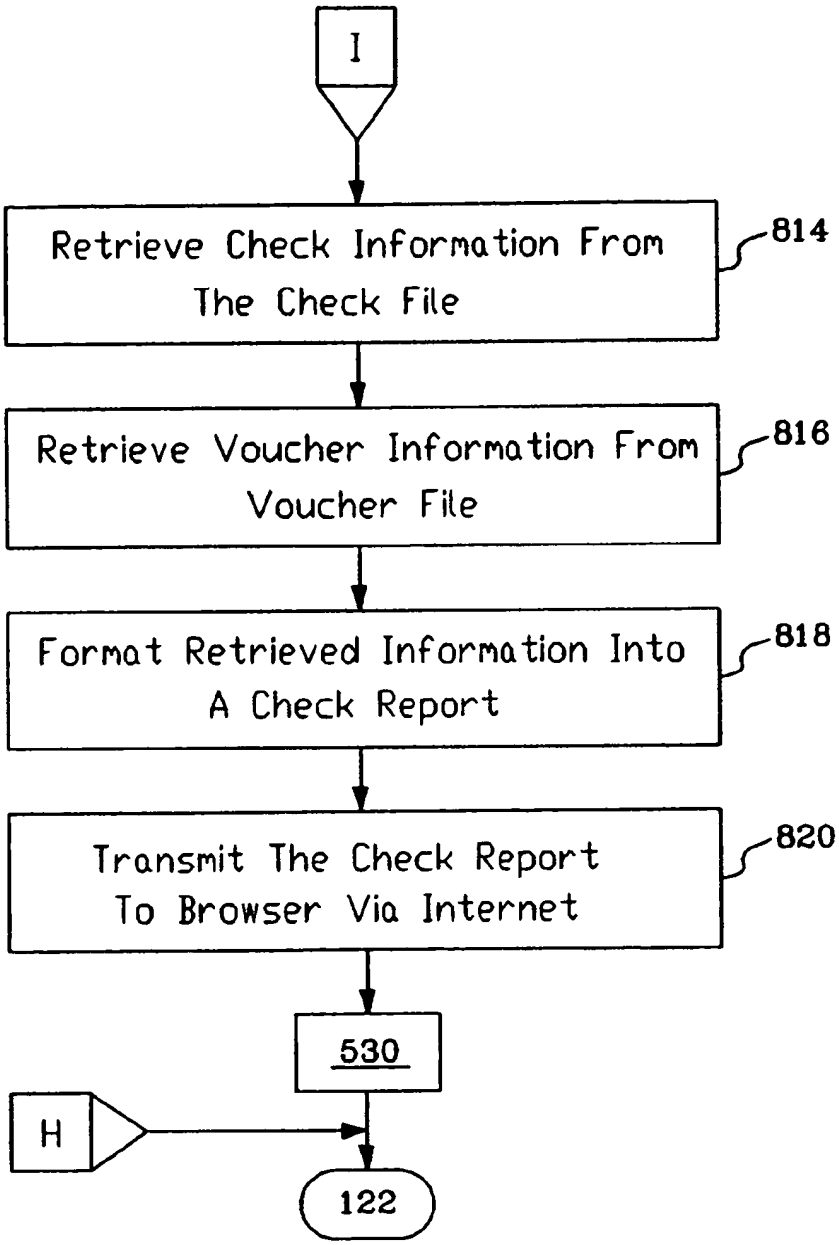

I
Retrieve Check Information From The Check File
814
Retrieve Voucher Information From Voucher File
816
Format Retrieved Information Into A Check Report
818
Transmit The Check Report To Browser Via Internet
820
530
H
122

FIG.8B

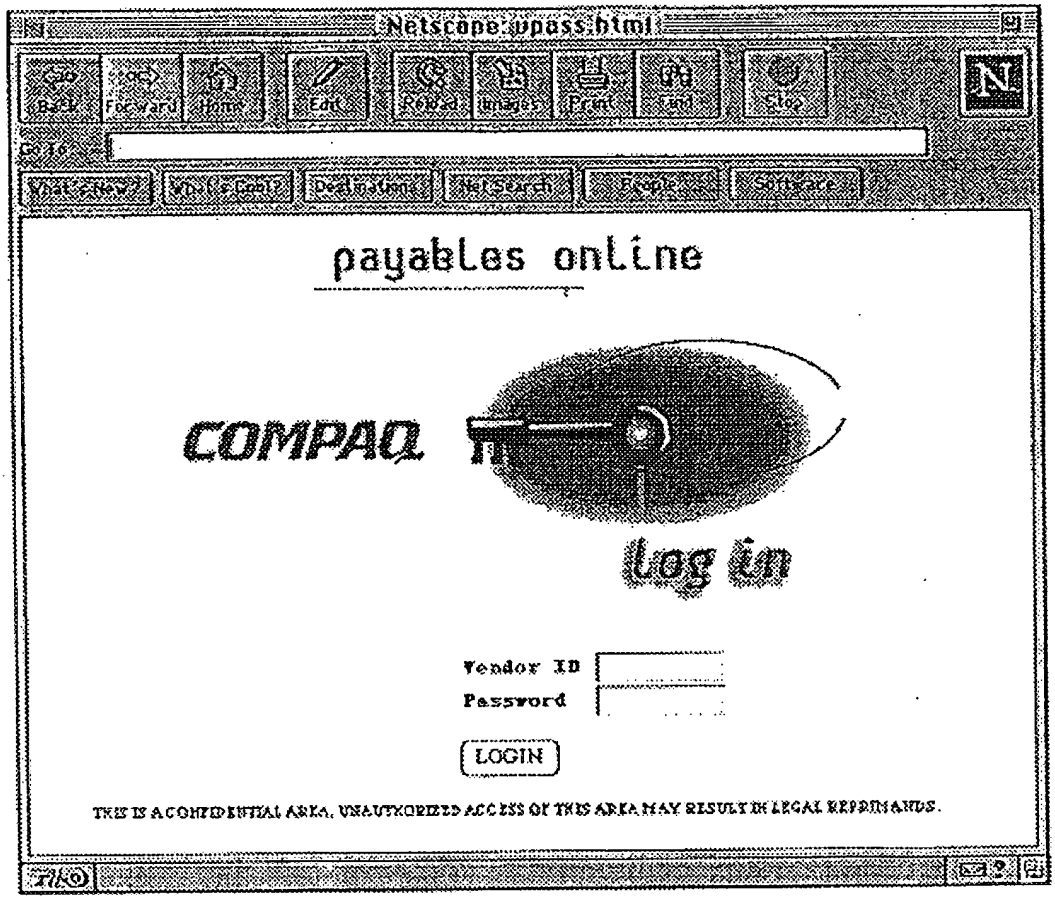

Netscape: vpass.html
payables online
COMPAQ
log in
Vendor ID
Password
LOGIN
THIS IS A CONFIDENTIAL AREA. UNAUTHORIZED ACCESS OF THIS AREA MAY RESULT IN LEGAL REPRIMANDS.

FIG. 9A

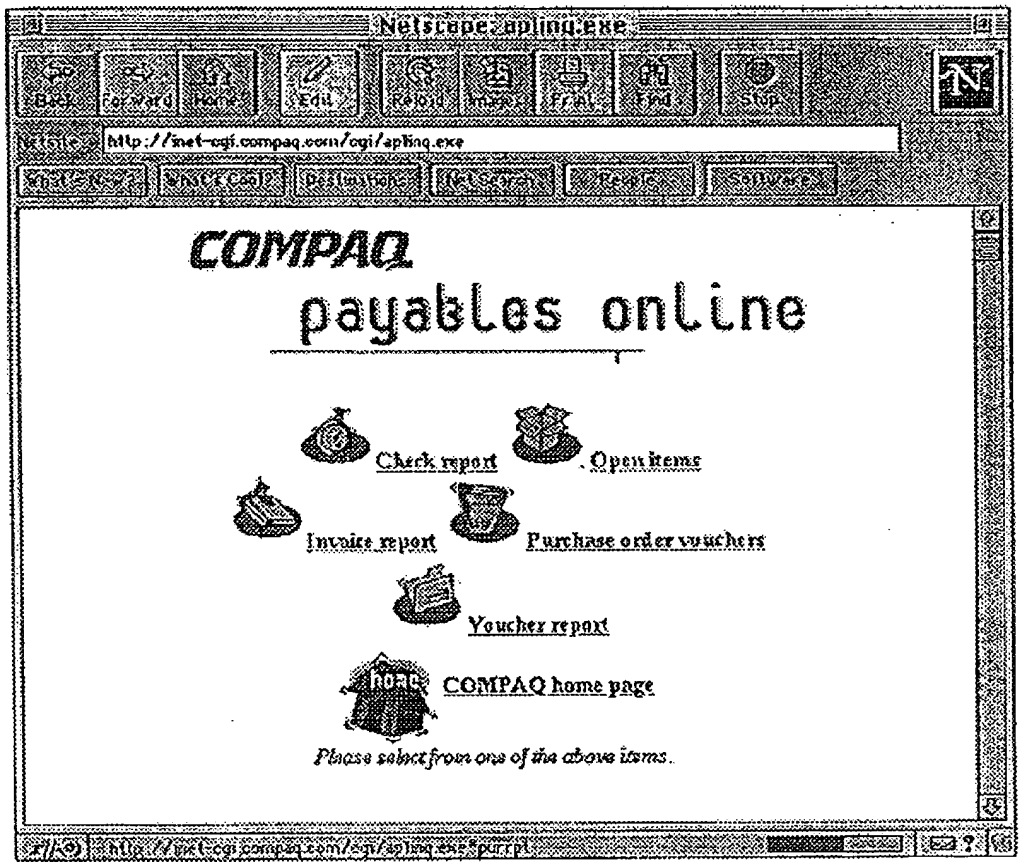

Netscape: aplinq.exe
http://inet-cgi.compaq.com/cgi/aplinq.exe
COMPAQ
payables online
Check report
Open items
Invoice report
Purchase order vouchers
Voucher report
COMPAQ home page
Please select from one of the above items.

FIG. 9B

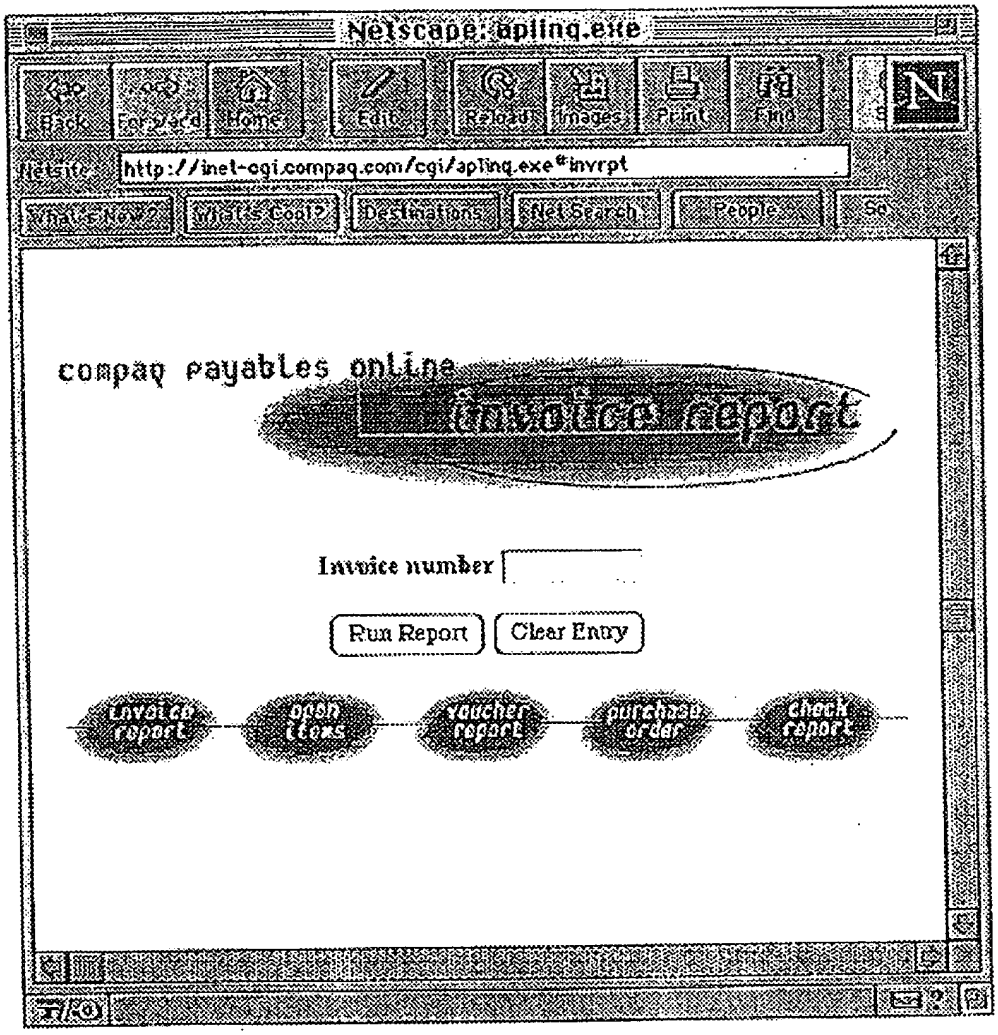

Netscape: apling.exe
Back
Forward
Home
Edit
Reload
Images
Print
Find
Stop
Netsite: http://inet-cgi.compaq.com/cgi/apling.exe?invrpt
What's New?
What's Cool?
Destinations
Net Search
People
compaq payables online
invoice report
Invoice number
Run Report
Clear Entry
invoice report
open items
voucher report
purchase order
check report

FIG. 9C

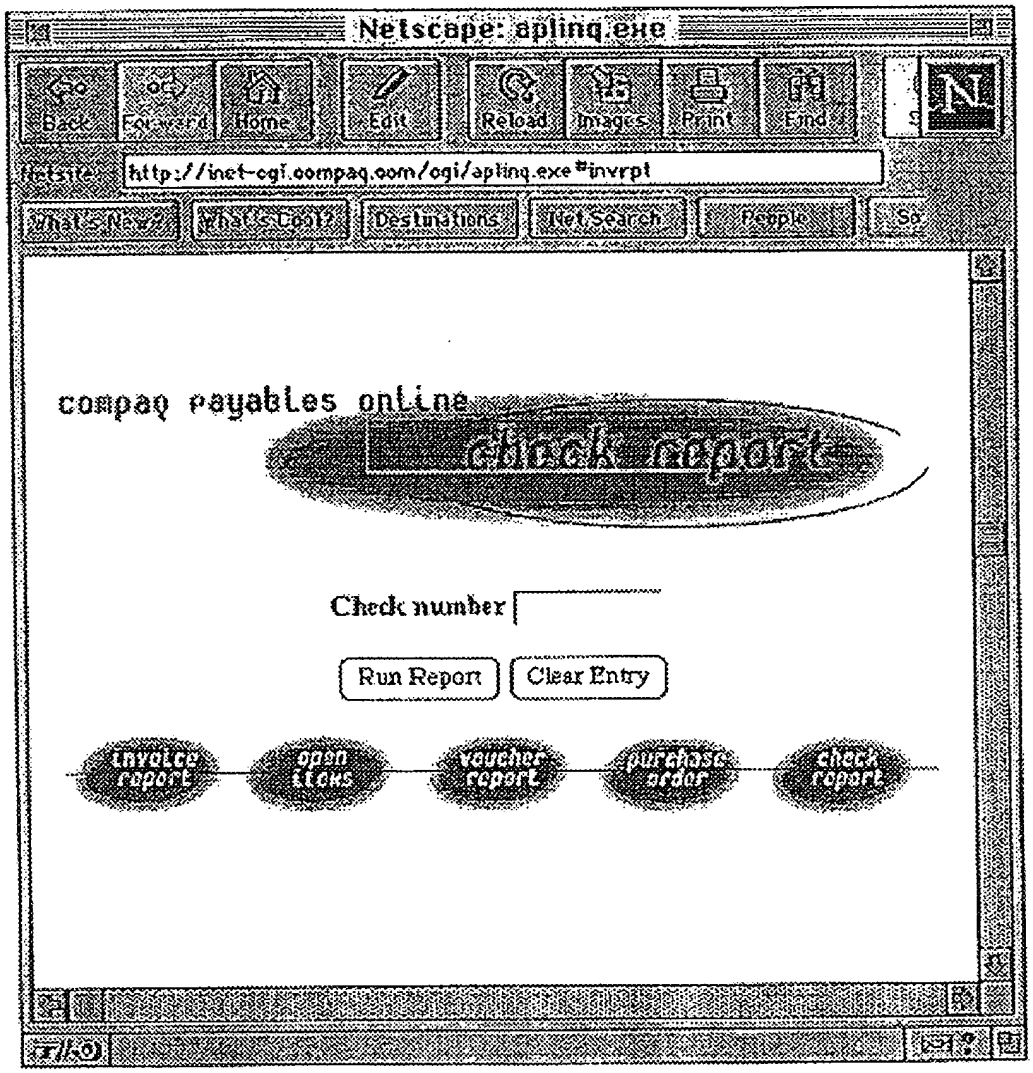

Netscape: apling.exe
Back
Forward
Home
Edit
Reload
Images
Print
Find
Stop
Netsite: http://inet-cgi.compaq.com/cgi/apling.exe?invrpt
What's New?
What's Cool?
Destinations
Net Search
People
compaq payables online
check report
Check number
Run Report
Clear Entry
invoice report
open items
voucher report
purchase order
check report

FIG. 9D

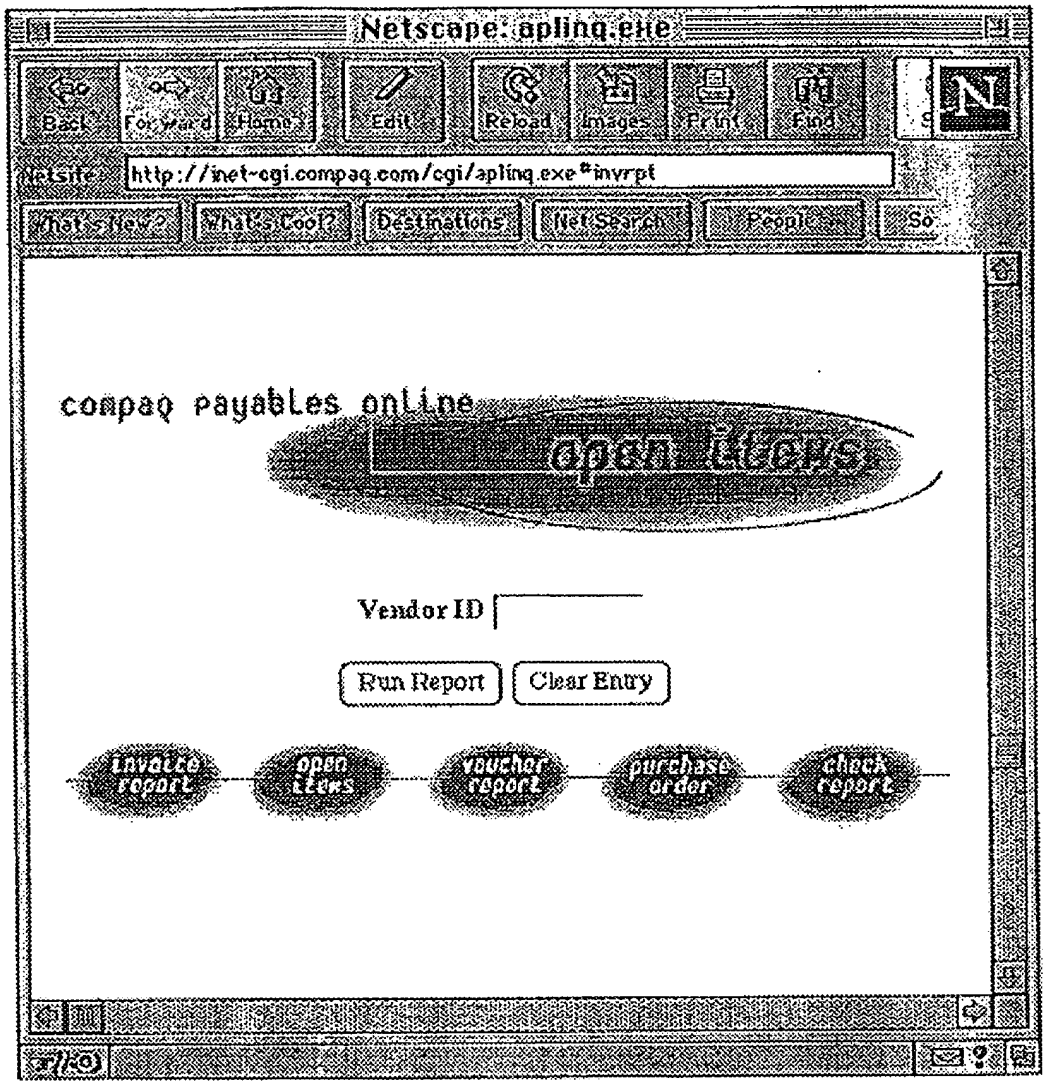

Netscape: apling.exe
Back
Forward
Home
Edit
Reload
Images
Print
Find
Netsite: http://inet-cgi.compaq.com/cgi/apling.exe?invrpt
What's New?
What's Cool?
Destinations
Net Search
People
compaq payables online
open items
Vendor ID
Run Report
Clear Entry
invoice report
open items
voucher report
purchase order
check report

FIG. 9E

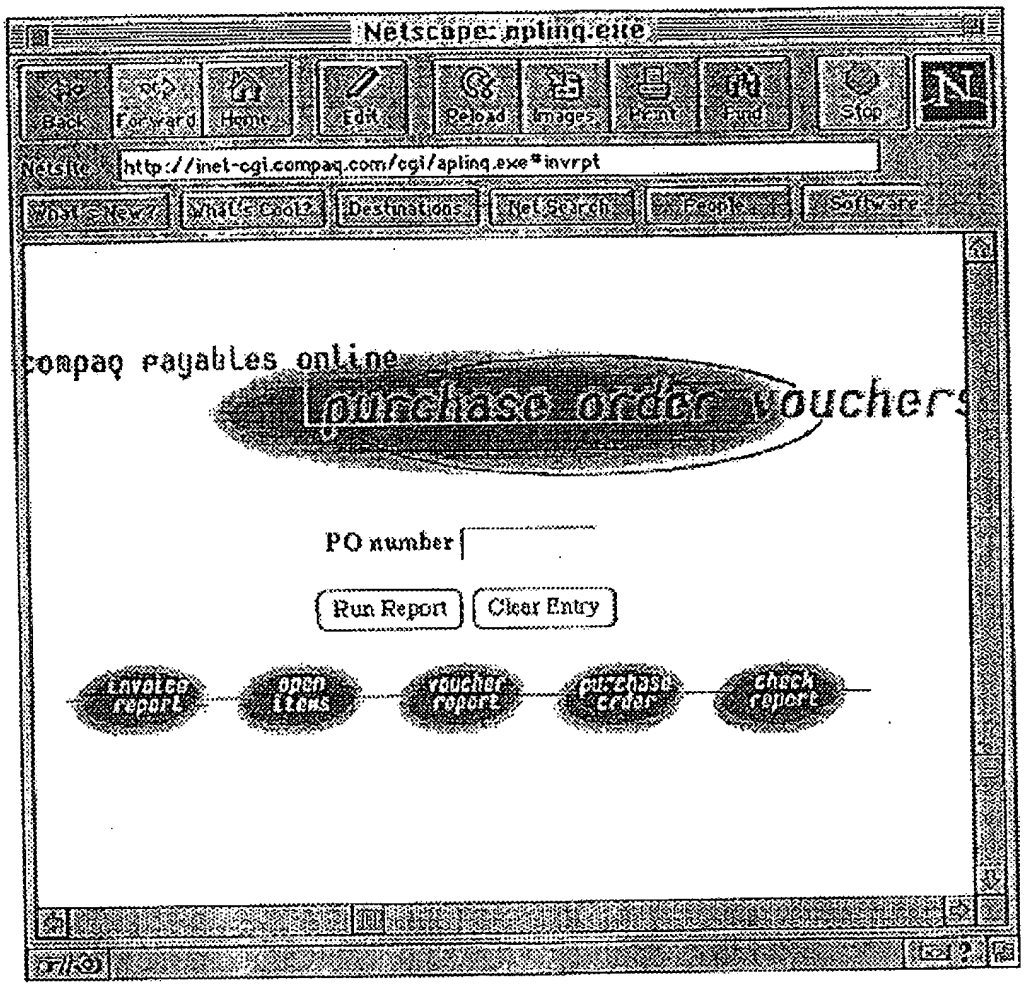

Netscape: aplinq.exe
Back
Forward
Home
Edit
Reload
Images
Print
Find
Stop
Netsite: http://inet-cgi.compaq.com/cgi/aplinq.exe?invrpt
What's New?
What's Cool?
Destinations
Net Search
People
Software
compaq payables online
Purchase order vouchers
PO number
Run Report
Clear Entry
invoice report
open items
voucher report
purchase order
check report

FIG. 9F

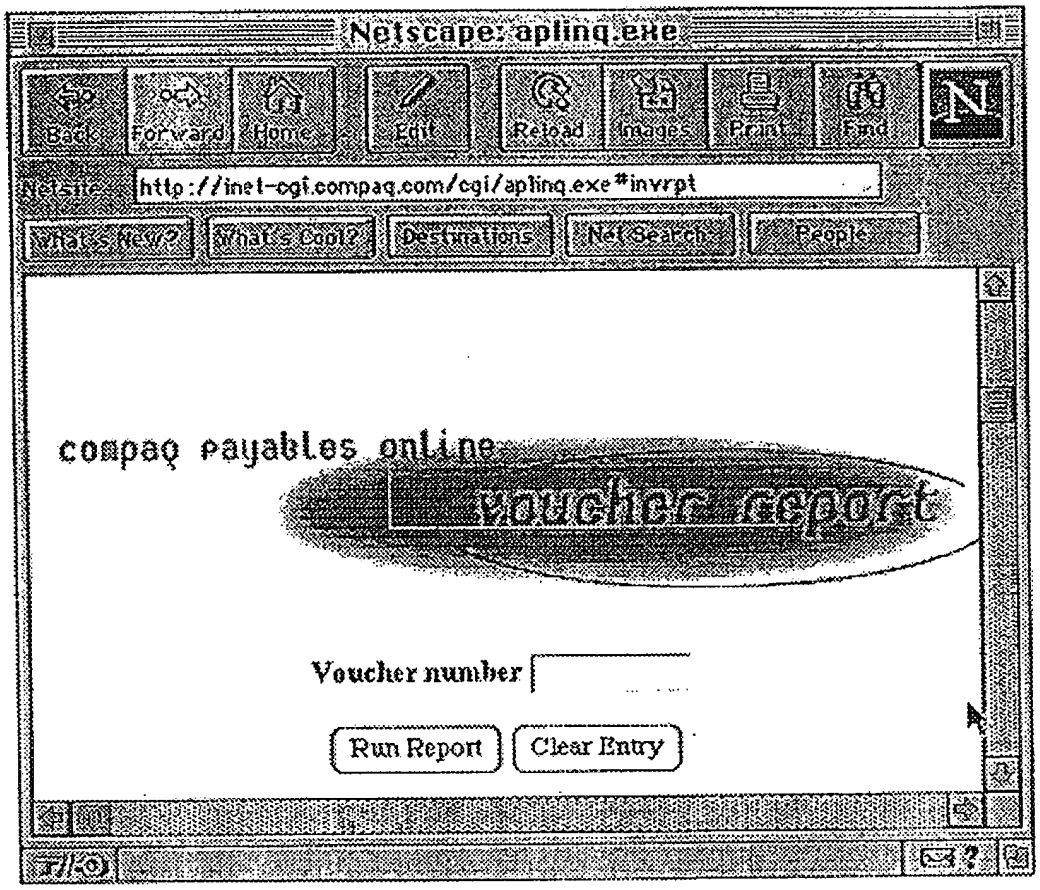

Netscape: aplinq.exe
Back
Forward
Home
Edit
Reload
Images
Print
Find
Netsite: http://inet-cgi.compaq.com/cgi/aplinq.exe*invrpt
What's New?
What's Cool?
Destinations
Net Search
People
compaq payables online
voucher report
Voucher number
Run Report
Clear Entry

FIG. 9G

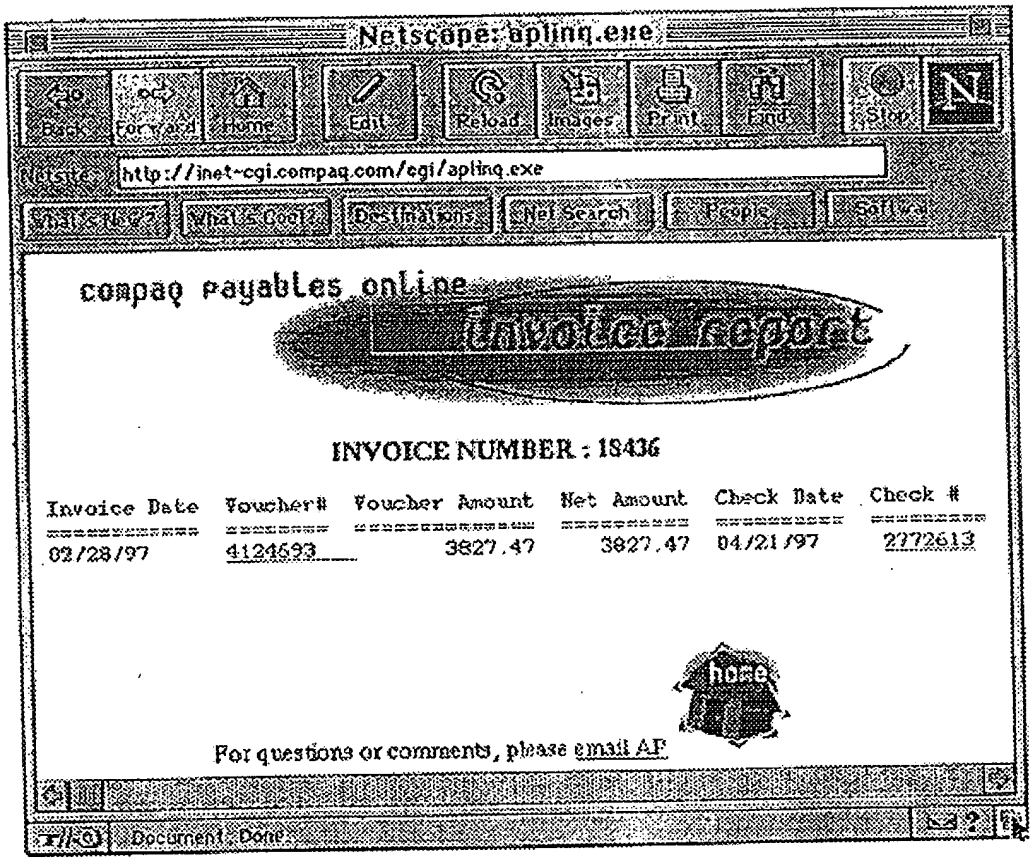

Netscape: apling.exe
Back
Forward
Home
Edit
Reload
Images
Print
Find
Stop
Netsite: http://inet-cgi.compaq.com/cgi/apling.exe
What's New?
What's Cool?
Destinations
Net Search
People
Software
compaq payables online
invoice report
INVOICE NUMBER : 18436
Invoice Date
Voucher#
Voucher Amount
Net Amount
Check Date
Check #
02/28/97
4124693
3827.47
3827.47
04/21/97
2272613
home
For questions or comments, please email AP
Document: Done

FIG. 10A

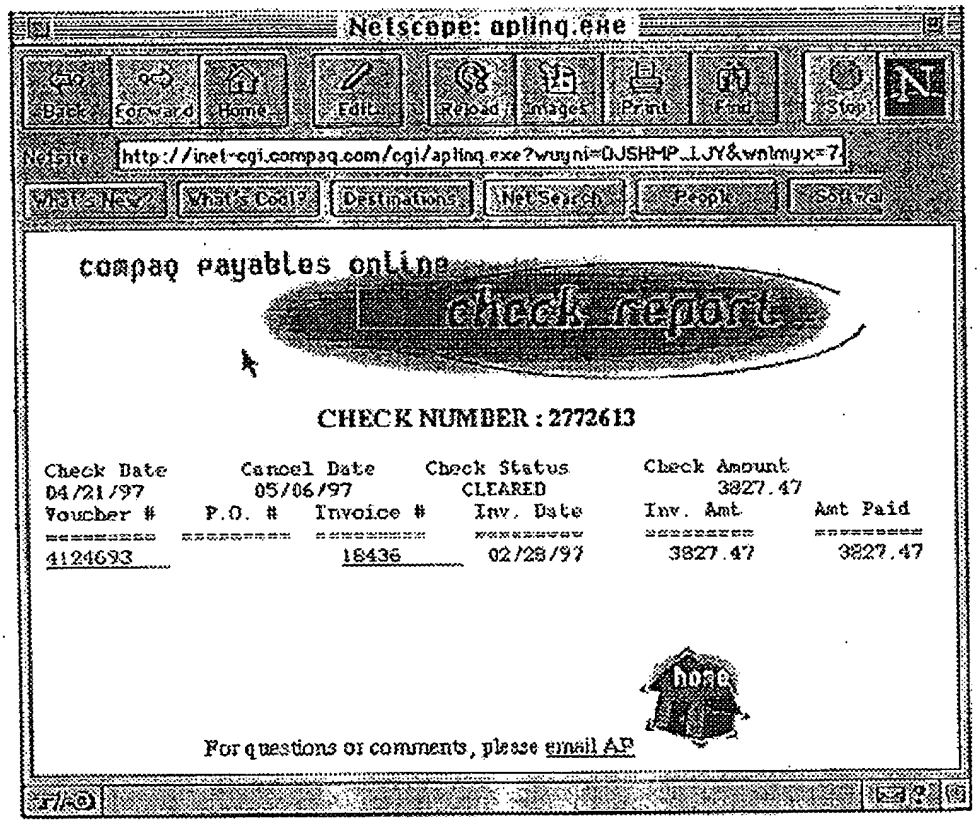

Netscape: apling.exe
Back
Forward
Home
Edit
Reload
Images
Print
Find
Stop
http://inet-cgi.compaq.com/cgi/apling.exe?wuyni=0JSHMP_LJY&wnlmyx=7
What's New?
What's Cool?
Destinations
Net Search
People
compaq payables online
check report
CHECK NUMBER : 2772613
Check Date
04/21/97
Cancel Date
05/06/97
Check Status
CLEARED
Check Amount
3827.47
Voucher #
P.O. #
Invoice #
Inv. Date
Inv. Amt
Amt Paid
4124693
18436
02/28/97
3827.47
3827.47
home
For questions or comments, please email AP

FIG. 10B

METHOD AND APPARATUS FOR SECURE VENDOR ACCESS TO ACCOUNTS PAYABLE INFORMATION OVER THE INTERNET

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to accessing account information and, more particularly, to accessing account information over a network.

2. Description of the Related Art

Many business entities typically work with a number of vendors or suppliers to produce their products and/or services. Larger business entities (e.g., midsize and large corporations) typically include an accounts receivable department and an accounts payable department. An accounts payable department is responsible for payment of the invoices received by vendors or suppliers. An accounts receivable department is responsible for sending out invoices to various business entities and monitoring payment of the invoices. The accounts payable department of a business entity interacts with accounts receivable departments of its vendors or suppliers.

Conventionally, personnel of the accounts receivable departments of the vendors or suppliers daily or weekly telephone personnel of the accounts payable department of the business entity to ask for information such as invoice payments and, when invoices have been paid, the check number and amount of the check. Typically, clerks at the accounts payable department of the business entity would have to service the telephone or facsimile inquiries. The clerks would then look up the information requested either on a computer system or in manual files of the business entity. Thereafter, the clerk would return the telephone calls or facsimiles to respond to the inquiries.

One problem with the conventional interaction between accounting departments of business entities is that the substantial amount of man power required to service these account inquiries from suppliers or vendors is burdensome for the business entities. The account inquiries are particularly disruptive to the accounts payable departments of business entities.

Also, telephonic methods of accessing account information have been conventionally utilized. For example, a vendor or supplier could telephone a business entity to access certain limited account information by entering a password code and various other codes on the telephone keypad. However, telephonic methods are also problematic because not only does it take a long amount of time to request and receive the information, but only a limited amount of account information can be accessed in this manner.

Thus, there is a need for improved ways for suppliers or vendors to access account information of a business entity.

SUMMARY OF THE INVENTION

Broadly speaking, the invention relates to improved techniques for remotely accessing account information through the Internet. The invention provides security measures so that unauthorized access is unlikely even though the Internet is utilized. Assuming access is authorized, the invention acquires the requested account information and then presents the requested account information to a requester via the Internet in a format suitable for the type of requested account information. In addition, as an additional security measure, the invention may also filter out any account holder identifying information from the requested account information such that the account information presented to the requester does not identify the account holder.

In one embodiment, the account information being remotely accessed via the Internet is the actual (i.e., "live") account information of a business entity. As an example, the account information can be accounts payable information of the business entity which is stored on and accessed directly from a financial database ordinarily used by the business entity. Normally, the financial database is stored on a secure financial computer protected from external network access by a firewall.

The invention can be implemented in numerous ways, including as a method, a system, or a computer readable medium. Several embodiments of the invention are discussed below.

As a method for accessing account information from a business entity financial computer over the Internet, an embodiment of the invention includes: requesting, a client machine, access to a server machine, the client machine and the server machine being coupled to the Internet, and the server machine having a secure connection to the business entity financial computer; determining whether access is authorized; requesting, at the client machine, account information from the business entity financial computer; extracting, at the server machine, the requested account information from the business entity financial computer over the secure connection; and forwarding at least a portion of the extracted data from the server machine to the client machine.

As a method for accessing account information from a business entity financial computer over the Internet, another embodiment of the invention includes: requesting, a client machine, access to an Internet server machine, the client machine and the Internet server machine being coupled to the Internet, and the Internet server machine having a secure connection to the business entity financial computer; determining whether access is authorized; displaying, at the client machine, an information selection screen offering a plurality of different report types of account information when access is determined to be authorized; selecting one of the different report types of account information; displaying a data entry screen for the selected report type; entering data for the selected report type using the data entry screen being displayed; transmitting, to the server machine, a request for the selected report type in accordance with the data entered; extracting, at the server machine, the requested account information from the business entity financial computer over the secure connection; producing a report of the selected report type from at least a portion of the extracted account information; forwarding the report produced from the server machine to the client machine; and displaying, at the client machine, the report forwarded from the server machine.

As a system for remotely viewing accounts payable information, an embodiment of the invention comprises: an account information computer that stores the accounts payable information for a business entity, the accounts payable information is the actual, up-to-date accounts payable information for the business entity; a local network server machine coupled to the account information computer over a secure communications link and coupled to the Internet; and a remote client machine coupled to the Internet. A vendor representative for a vendor can operate the remote client machine to gain access to accounts payable information for the vendor that is stored in the account information

computer. The vendor enters a request at the remote client machine, and then the request is forwarded to the local network server through the Internet. The local network server interprets the request and accesses the accounts payable information computer via the secure communications link to obtain certain accounts payable information for the vendor. Thereafter, the certain accounts payable information is then forwarded to the remote client machine through the Internet.

As a computer readable medium containing program instructions for accessing account information from a business entity financial computer over the Internet, an embodiment of the invention includes: first computer readable code for requesting, a client machine, access to a server machine, the client machine and the server machine being coupled to the Internet, and the server machine having a secure connection to the business entity financial computer; second computer readable code for determining whether access is authorized; third computer readable code for requesting, at the client machine, account information from the business entity financial computer; fourth computer readable code for extracting, at the server machine, the requested account information from the business entity financial computer over the secure connection; and fifth computer readable code for forwarding at least a portion of the extracted data from the server machine to the client machine.

The advantages of the invention are numerous. One advantage of the invention is that the man power required to service incoming inquiries from vendors or suppliers regarding payment of their invoices is substantially reduced. Another advantage of the invention is that vendors or suppliers are able to access account information of the business entity to determine the payment status of their invoices. Still another advantage of the invention is that the account information from the business entity concerning vendors or suppliers can be downloaded and imported into a spreadsheet. Yet another advantage of the invention is that a vendor can be electronically notified of the payment of an invoice prior to funding their account with said payment. This advance notification allows vendors or suppliers to pre-post their receivables and thus provide a cash forecast.

Other aspects and advantages of the invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, illustrating by way of example the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

FIG. **1A** is a block diagram of an account information access system according to an embodiment of the invention;

FIGS. 1B and 1C are flow diagrams of information access processing according to an embodiment of the invention;

FIG. **2** is a flow diagram of access verification processing according to an embodiment of the invention;

FIG. **3** is a block diagram of display processing for a main screen according to an embodiment of the invention.

FIGS. 4A and 4B are flow diagrams of report generation processing according to embodiment of the invention;

FIGS. 5A–5C are flow diagrams of invoice report processing according to an embodiment of the invention;

FIGS. 6A and 6B are flow diagrams of a voucher report processing according to an embodiment of the invention;

FIGS. 7A and 7B are flow diagrams of open items report processing according to an embodiment of the invention;

FIGS. 8A and 8B are flow diagrams of check report processing according to an embodiment of the invention;

FIGS. 9A–9G are screen shots of a login display screen and various portions of a main screen suitable for use with the invention; and

FIGS. 10A–10D are screen shots of various request screens and their associated reports produced at the Internet browser application on the client machine.

DETAILED DESCRIPTION OF THE INVENTION

The invention relates to improved techniques for remotely accessing account information through the Internet. The invention provides security measures so that unauthorized access is unlikely even though the Internet is utilized. Assuming access is authorized, the invention acquires the requested account information and then presents the requested account information to a requester via the Internet in a format suitable for the type of requested account information. In addition, as an additional security measure, the invention may also filter out any account holder identifying information from the requested account information such that the account information presented to the requester does not identify the account holder.

The invention is particularly advantageous when the account information being remotely accessed via the Internet is the actual (i.e., "live") account information of a business entity. As an example, the account information can be accounts payable information of the business entity which is stored on and accessed directly from a financial database ordinarily used by the business entity. Ordinarily, the financial database is stored on a secure financial computer protected from external network access by a firewall.

Embodiments of the invention are discussed below with reference to FIGS. 1A–10D. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

FIG. **1A** is a block diagram of an account information access system **10** according to an embodiment of the invention. The account information access system **10** provides for remote access to account information via the Internet. More particularly, the account information access system **10** includes a server machine that is coupled to a corporate financial computer **14** over a secure communication channel **16**. The communication channel **16** is secure because it passes through a firewall **18** located between the server machine **12** and the corporate financial computer **14**. The corporate financial computer **14** includes a database **20** that holds the account information that is accessible by the server machine **12** over the communication link **16**. The server machine **12** is coupled to the Internet **22** through a link **24**. Typically, the link **24** is a high speed data link. Hence, since the server machine **12** is connected to the publicly accessible Internet **22**, users or requesters on client machines (e.g., the client machine **26**) coupled to the Internet are able to access the server machine **12** and instruct the server machine **12** to access the database **20** on the corporate financial computer **14**, and return the results to the requesting client machine. For example, the client machine **26** can operate an Internet browser application and communicate with the server machine **12** that hosts a website using Hyper Text Transfer Protocols (HTTP) and Hyper Text Markup Language (HTML) pages.

Although the account information access system **10** provides for remote access to account information via the Internet, the access has various security measures. For example, access is permitted only if the account is activated for remote access and the requester successfully logs in with a password. Also, the account information that the requester is able to view is only that account information that pertains to the requester. Still further, no account holder information is accessible by the requesters, only the account data itself (typically numbers and alpha-numeric identifiers). The information that a requester requests to view is presented to the user as a report. In one embodiment, the report is an HIML file that is formed by the server machine **12** and transmitted to the client machine **26** where it is displayed via the Internet browser application. The security measures processing and the report generation processing are described in detail below with respect to FIGS. 1B through 8B.

FIGS. 1B and 1C are flow diagrams of information access processing **100** according to an embodiment of the invention. The information access processing **100** is instructed by a user of a client machine (computer), and processed by the client machine and a server machine (computer). The results of the information access processing **100** are then displayed to the user at the client machine. The processing by the server machine includes accessing an account information database maintained on an account information machine (computer) such as a corporate financial computer containing financial or account information for a business (e.g., corporation). The interconnection of the client machine, the server machine and the account information machine are discussed below with respect to FIG. **9**.

Initially, a universal resource locator (URL) is entered **102** to specify an account information website. Typically, the URL would be entered **102** into an address line of an Internet browser application (e.g., Netscape Navigator). Upon entry of the URL, the Internet browser application operates to go to that location (address), retrieve a page (e.g., HTML page) associated with that address from the server machine, and then transmit the page to the Internet browser application running on the client machine.

After the Internet browser application receives the page from the server machine, a login screen is displayed **104** at the client machine because the received page is the login screen. The login screen serves to allow users to attempt to gain access to certain account information residing on the account information machine. To gain access, the user enters **106** a vendor identifier and a password. Thereafter, the user requests **108** login. The login request is then transmitted by the Internet browser application to the server machine.

Upon receiving the login request, the server machine determines whether or not the login request will be authorized or denied. A decision block **110** then determines whether access to the account information machine is authorized. When the access is not authorized, the information access processing **100** is complete and ends. Here, access is denied if either the vendor identifier entered is not an authorized identifier or, when the vendor identifier is authorized, the password entered does not match a stored password. On the other hand, when access is determined to be authorized, a main screen (e.g., HTML page) is transmitted from the server machine to the client machine. The main screen is then displayed **112** on the client machine.

From the main screen, the user is able to select one of a plurality of different report types. Each of the report types provide to the user account information. The account information is extracted from the account information database in the account information machine. Hence, at this point in the information access processing **100**, a decision block **114** determines whether a particular report type has been selected by the user. The user is able to select a particular report type by, for example, a "point-and click" action with respect to the main screen being displayed on the client machine. As long as no particular report type has been selected, the information access processing **100** waits until a particular report type is selected. However, once a particular report type has been selected, the information access processing **100** continues.

When the information access processing **100** continues following the selection of a particular report type, a data entry screen is displayed **116** for the selected report type. Next, data for a desired report of the selected report type is entered **118**. Typically, the data entered **118** will vary with the type of report being requested. The data entered **118** is then transmitted by the Internet browser application over the Internet to the server machine hosting the account information website.

At the server machine, the desired report is produced **120** in accordance with the entered data. In producing the desired report, the server machine interacts and extracts account information from the account information database on the account information machine. After the desired report is produced, the server machine transmits the desired report to the user over the Internet to the Internet browser application on the server machine.

After the Internet browser application receives the desired report from the server machine, the desired report is displayed **122**. Typically, the desired report is a HTML page that is displayed by the Internet browser application. At this point, the user has received the report containing account information that was requested. By way of the Internet browser application, the user is then able to view, print, save or download the report or its data. Following block **122**, the information access processing **100** is complete and ends.

FIG. **2** is a flow diagram of access verification processing **200** according to an embodiment of the invention. The access verification processing **200** is performed by the server machine and represents processing carried out by the information access processing **100** during determination of whether access is authorized **110**.

The access verification processing **200** initially receives **202** a vendor identifier (user-entered vendor identifier) and a password from the Internet browser application on the client machine. Next, a stored password that is associated with the vendor identifier is retrieved **204**. Preferably, the stored password is stored on a storage device associated with the server machine. A log entry is also stored **206** to a log file. In one embodiment, the log file resides on the server machine and includes log entries that include various information that may be used for diagnostic or security evaluations. As examples, the information stored in a log entry can include: date-time stamp, vendor identifier, report identifier, Common Gateway Interface (CGI) remote host address, TCP/IP address, and the like.

Next, the user-entered vendor identifier and password are then validated **208**. The validation process for the user-entered vendor identifier and password can be provided by comparing the user-entered vendor identifier against a set of active vendor identifiers to first determine whether the vendor identifier is recognized and thus permitted access. Then, if the user-entered vendor identifier is recognized, the validation process determines whether the stored password

associated with the vendor identifier matches the password that the user has entered.

A decision block **210** then determines whether the user-entered vendor identifier and password have been successfully validated. When the validation process is unsuccessful, a counter is incremented **212** to indicate a failed attempt to obtain access. Then, a decision block **214** determines whether the count is greater than or equal to four (4). If the count of failed attempts is determined by the decision block **214** to not equal or exceed four (4), then the user is permitted to continue to try to access the account information by returning to repeat block **104** and subsequent blocks of the information access processing **100**. On the other hand, when the count of failed attempts is determined by the decision block **214** to equal or exceed four (4), then the vendor identifier that the user has entered is deactivated **216**. By deactivating the vendor identifier after a predetermined number of failed attempts, system security is maintained because an unauthorized user will most likely not be able to guess the password for a particular vendor in three (3) attempts. Following block **216**, the access verification processing **200** is complete and ends for lack of authorization, and likewise ends the information access processing **100** with a denial of access.

On the other hand, when the decision block **210** determines that the user-entered vendor identifier and password have been validated successfully, a decision block **218** determines whether the vendor identifier has a new status indication associated therewith. In one embodiment, the new status is associated with a vendor (vendor identifier) when the activation of the remote access capability for the vendor has recently been set up and not before now utilized. When the decision block **218** determines that the account does not currently have the new status associated therewith, then a use counter and date last used are updated **220**. In one embodiment, a use counter is recorded in a usage file for each of the vendors and a date-time stamp is recorded in a usage file with each access. From the counters, a system administrator is able to easily determine the number of times a particular vendor has utilized the remote access capabilities of the system. The date-time stamp can serve to indicate when particular vendors utilized the remote access capabilities of the system. Following block **220**, the access verification processing **200** is complete and processing then returns to block **112** of the information access processing **100**.

FIG. **3** is a block diagram of display processing **300** for a main screen according to an embodiment of the invention. The display processing **300** corresponds to the processing carried out by the block **112** of the information access processing **100**. Generally, the display processing **300** operates to display a main screen on the client machine, specifically on a display screen of the client machine.

The display processing **300** initially retrieves **302** a main screen template. Here, the server machine operates to retrieve **302** the main screen template from a storage area of the server machine. The advantage of using a template for the main screen is that the main screen is effectively predesigned and constructed as a HTML page but is then further customized and finalized by subsequent processing. In this example, the main screen file is further customized and finalized by embedding various information into the main screen file as well as by determining which portions of the template to include or not include in the main screen file in accordance with predetermined configuration information for the account. The customizing and finalizing is performed by dynamic HTML using, for example, JavaScript.

After retrieving the main screen template, the server machine operates to embed **304** the vendor identifier into the main screen template. Preferably, the vendor identifier is embedded **304** into the template as a hidden value. A hidden value is a value that is part of the file, but is not displayed or accessible to a user that views and interacts with the displayed file.

Next, a main screen file is produced **306** from the template based on those reports available to the vendor. Namely, in one example, the main screen template is assumed to include a full set of reports that may possibly be made available to the vendor. Then the customization and finalization produces the main screen file from the main screen template so that only those reports available to a particular vendor are contained in the main screen file (as identified by predetermined configuration information).

The main screen file is transmitted **308** to the Internet browser application on the client machine. Thereafter, the main screen is displayed **310** by the Internet browser application running on the client machine. Following block **310**, the display processing **300** for the main screen is complete and processing then returns to block **114** of the information access processing **100**.

FIGS. **4**A and **4**B are flow diagrams of report generation processing **400** according to an embodiment of the invention. The report generation processing **400** corresponds to processing carried out by the block **120** of the information access processing **100** illustrated in FIG. 1C. In particular, the report generation processing **400** produce a desired report. Preferably, the report generation processing **400** is performed at the server machine.

The report generation processing **400** initially receives **402** an information request message from the Internet browser application via the Internet. The information request message, for example, includes user request data (e.g., check number, voucher number, etc.), a selected report type and a vendor identifier. After receiving the information request message, a return data channel is opened **404** from the server machine to the Internet browser application on the client machine. Additionally, the Internet browser application may be instructed to clear its screen and perhaps indicate that the request is being processed. The advantage of opening the return data channel soon after receiving the information request message is that the user is notified that the request has been issued and that the server machine is working to satisfy the request.

Next, a database located on a corporate financial computer is opened **406**. The database on the corporate financial computer is the database that holds all the account information for the corporation. The account information for the corporation is, for example, the accounting information such as vendor information, check payments, vouchers, invoices and the like that are utilized in a financial department of a business. Hence, it is preferable that the database be the same database where the financial information is normally kept by the corporation. Accordingly, the database being opened **406** is preferably not a new database or a specialized database that provides a subset of information that is accessible via the Internet, but is instead the actual database that would normally be accessed by those internal to the corporation. It should also be noted that corporate or corporation refers to a business generally and is not limited to businesses that are legally formed as corporations.

The information request message is then parsed **408** to obtain the vendor identifier, the selected report type, and the user request data. In one embodiment, the information

request message is transmitted to the server machine by a POST command of HTTP protocol. Here, the information request message is parsed **408** to obtain the specific data items.

Next, the user request data is verified **410** to ensure that it is associated with the vendor identifier. Here, the report generation processing **400** checks whether the user request data (e.g., account information) that the user is requesting pertains to the vendor having the vendor identifier whose access has been authorized. This additional verification **410** prevents one vendor from viewing another vendor's account information. A decision block **412** then determines whether or not the verification check was successful.

If the verification check fails, an error message indicating that the data item requested does not exist is transmitted **414** to the Internet browser application on the client machine. Following block **414**, the report generation processing **400** is complete and processing returns to block **122** of the information access processing **100**.

On the other hand, when the verification check is successful, then a decision block **416** determines whether the user request data (i.e., item requested) exists. If the item requested does not exist, an error message that the item requested is not on file is transmitted **418** to the Internet browser application on the client machine. Following block **418**, the report generation processing **400** is complete and processing returns to block **122** of the information access processing **100**.

Alternatively, when the decision block **416** determines that the item requested does exist, the report generation processing **400** continues. Specifically, the associated records from the database on the corporate financial computer are retrieved **420**. Then, certain information from the retrieved records is formatted **422** into the desired report. The desired report can be any of a variety of report types. Examples of various desired reports and their formats are described below in detail. After the desired report is so formed, the desired report is transmitted **424** to the Internet browser application on the client machine via the Internet. Following block **424**, the report generation processing **400** is complete and processing returns to block **122** of the information access processing **100**.

In various embodiments of the invention, different report types may be utilized and produced. Examples of reports that are useful for obtaining access to financial information are: an invoice report, a voucher report, an open items report and a check report. With the generation of these different report types, the processing involved in producing a particular report is different depending on the report type being generated. However, in each case, the processing performed generally follows the processing described in the report generation processing **400** illustrated in FIGS. **4A** and **4B**. Even so, more specific processing is described below for several different report types with reference to FIGS. **5A** through **8B**.

FIGS. **9A–9G** are exemplary screen shots of a login display screen, a main screen and various data input screens for different report types suitable for use with the invention. Specifically, FIG. **9A** represents an exemplary login screen such as displayed by the displaying **104** of the information access processing **100**, and FIG. **9B** represents an exemplary main screen such as displayed by the displaying **112** of the information access processing **100**. Further, FIGS. **10A–10D** are exemplary screen shots of various request screens and their associated reports produced at the Internet browser application on the client machine.

FIGS. **5A–5C** are flow diagrams of invoice report processing **500** according to an embodiment of the invention. The invoice report processing **500** operates to produce an invoice report. In one embodiment, the invoice report processing **500** is performed by the server machine.

The invoice report processing **500** initially receives **502** an invoice report request from the Internet browser application via the Internet. Then, a return data channel is promptly opened **504** from the server machine to the Internet browser application on the client machine. A database on a corporate financial computer is also opened **506** so that access to the account information in the database will be available.

The invoice report request is then parsed **508** to obtain an invoice number, a vendor identifier, and a hidden vendor identifier. A vendor identifier (retrieved vendor identifier) that pertains to the invoice number obtained from the invoice report request is also retrieved **510** from a voucher file. The voucher file is a file within a database on a corporate financial computer and includes information on vouchers of the corporation.

A decision block **512** then determines whether a voucher associated with the invoice number exists. Here, the decision block **512** is determining whether there is a voucher for the invoice number that the user has requested information on. Typically, a corporation will issue a voucher for a particular invoice when the invoice has been received and initially processed by the corporation. When the decision block **512** determines that there is no voucher currently in the voucher file that is associated with the invoice number, then an error message is transmitted **514** to the Internet browser application on the client machine via the Internet. The error message in this case indicates that no voucher is on file for the invoice number. Following block **514**, the invoice report processing **500** is complete and processing returns to block **122** of the information access processing **100**.

On the other hand, when the decision block **512** determines that a voucher associated with the invoice number does currently exist in the voucher file, then a decision block **516** determines whether the vendor identifier retrieved from the voucher file matches both the vendor identifier and the hidden vendor identifier from the invoice report request. When the vendor identifiers do not match, then for security reasons access to the requested account information is denied and instead an error message is produced and transmitted **518** to the Internet browser application on the client machine. The error message in this case indicates that no voucher for the invoice number exists. Following block **518**, the invoice report processing **500** is complete and processing returns to block **122** of the information access processing **100**. In one embodiment, the requesters of the account information are vendors of the corporation. In such a case, the decision block **516** permits a vendor to remotely view their account information, but prevents the vendor from viewing the account information of other vendors.

Alternatively, when the decision block **516** determines that the various vendor identifiers properly match, then voucher information for the voucher associated with the invoice number is retrieved **520** from the voucher file. The voucher information, for example, may include: voucher number, voucher status, amount, and amount paid. The voucher information may also include: associated purchase order number, associated invoice number, and associated invoice date.

Next, a decision block **522** determines whether the status of the voucher is "PAID". For example, the voucher status

is either "PAID", "OPEN" or "VOID". When the decision block **522** determines that the status of the voucher is "PAID", then check information is retrieved **524** from a check file of the database. In one embodiment, the check file holds information on all checks issued by the corporation. Specifically, when the voucher in question has been paid, the payment is normally made by a check. Hence, when the voucher status is "PAID", check information should be available and retrieved from the check file. Typically, the appropriate check information in the check file can be identified by a check number that is associated with the voucher and obtained from the voucher file.

Following block **524**, or following the decision block **522** when the status of the voucher is not "PAID", the retrieved information is formatted **526** into an invoice report. Next, the invoice report is transmitted **528** to the Internet browser application on the client machine via the Internet. The database on the corporate financial computer is also closed **530**. Thereafter, the invoice report processing **500** is complete and the processing returns to block **122** of the information access processing **100**.

There are various ways to produce an invoice report such that the invoice information is presented to the requester in a logical and user friendly way. Norm ally, the invoice report will include various labels with amounts or identifiers associated with those labels. FIGS. **9**C and **10**A are exemplary screen depictions displayed by an Internet browser application on the client machine. More particularly, FIG. **9**C is an exemplary data entry screen for an invoice report, and FIG. **10**A is an exemplary invoice report.

FIGS. **6**A and **6**B are flow diagrams of a voucher report processing **600** according to an embodiment of the invention. The voucher report processing **600** produces a voucher report. In one embodiment, the voucher report processing **600** is performed by the server machine.

The voucher report processing **600** initially receives **602** a voucher report request from the Internet browser application on the client machine via the Internet. A return data channel and a database are then opened **504** and **506**, as previously discussed above. Next, the voucher report request is parsed **604** to obtain a voucher number, a vendor identifier, and a hidden vendor identifier. A vendor identifier (retrieved vendor identifier) that corresponds to the voucher number is also retrieved from a voucher file.

Next, a decision block **608** determines whether the voucher file contains a voucher associated with the voucher number. When the decision block **608** determines that the voucher requested does not exist, then an error message is transmitted to the Internet browser application on the client machine. The error message in this case indicates that the voucher requested is not on file. Following block **610**, the voucher report processing **600** is complete and processing returns to block **122** of the information access processing **100**.

On the other hand, when the decision block **608** determines that the voucher requested does exist in the voucher file, then the decision block **516** determines whether the various vendor identifiers match **516** as previously discussed. When the various vendor identifiers do not match, an error message is transmitted to the Internet browser application on the client machine. In this case, the error message indicates that the voucher requested does not exist. Here, the failure of the vendor identifiers to properly match precludes the requester from gaining access to account information that is not associated with the authorized vendor number. Following block **612**, the voucher report processing **600** is complete and processing returns to block **122** of the information access processing **100**.

Alternatively, when the decision block **516** determines that all the vendor identifiers do properly match, then voucher information is retrieved **614** from the voucher file. The voucher information can include: voucher number, voucher status, amount, and amount paid. The voucher information may also include: associated purchase order number, associated invoice number, and associated invoice date. Next, blocks **522** and **524** operate to retrieve check information from the check file when the voucher status is "PAID" as previously discussed above.

Next, receipt information for the voucher is retrieved **616** from a receipt file in the database on the corporate financial computer if such information is available. Then, the retrieved information is formatted **618** into a voucher report. Thereafter, the voucher report is transmitted **620** to the Internet browser application on the client machine via the Internet. Next, the database on the corporate financial computer is closed **530** as previously discussed. Following block **530** in FIG. **6**B, the voucher report processing **600** is complete and processing returns to block **122** of the information access processing **100**.

A voucher report can take many forms and include a variety of information. Normally, the voucher report will include various labels with amounts or identifiers associated with those labels. For example, labels and their amounts and identifiers typically would pertain to: a voucher number, a voucher status, an invoice number, an invoice date, a voucher amount, an amount paid, and check information if the voucher has been paid. FIGS. **9**G and **10**C are exemplary screen depictions displayed by an Internet browser application on the client machine. More particularly, FIG. **9**G is an exemplary data entry screen for a voucher report, and FIG. **10**C is an exemplary voucher report.

FIGS. **7**A and **7**B are flow diagrams of open items report processing **700** according to an embodiment of the invention. The open items report processing **700** produces an open items report. The open items report indicates those items being processed by the corporation that have not been fully processed. For example, invoices that a vendor provides to a corporation that are to be paid are given a voucher number when entered into the system for payment. However, these vouchers are open items because they are not completed until the vouchers have been paid by checks from the corporation. In one embodiment, the open items report processing **700** is performed by the server machine.

The open items report processing **700** initially receives **702** an open items report request from an Internet browser application via the Internet. Then, a return data channel and a database are opened **504** and **506** as previously discussed with reference to FIG. **5**A. Next, the open items report request is parsed **704** to obtain a vendor identifier and a hidden vendor identifier.

A decision block **706** determines whether the entered vendor identifier matches the hidden vendor identifier. When the vendor identifiers do not properly match, then an error message is transmitted **708** to the Internet browser application on the client machine. In this manner, the authorized vendor that has successfully logged in and granted access to the system is nevertheless denied access to the account information or the generation of an open items report because the vendor identifier entered in requesting the report differs from the vendor identifier that has successfully logged in. Following block **708**, the open items report processing **700** is complete because access has been denied

and processing returns to block **122** of the information access processing **100**. However, with respect to block **122** in this case, no desired report would be displayed but instead the error message would be displayed.

On the other hand, when the decision block **706** determines that the vendor identifiers do properly match, then voucher information is retrieved for all vouchers in the voucher file that have an "OPEN" status and are associated with the vendor identifier. Typically, this will produce a list of vouchers that are currently open. Next, totals may be computed **712** for the various categories of information. For example, the voucher information typically includes a voucher amount, and thus the total for the various vouchers can be computed **712** such that the open items report can provide totals to the requester. The voucher information is then formatted **714** to an open items report. Thereafter, the open items report is transmitted **716** to an Internet browser application on the client machine via the Internet. Then, the database is closed **530** as previously discussed, and processing returns to block **122** of the information access processing **100** where the desired report, namely the open items report, is displayed by the Internet browser application on the client machine via the Internet.

An open items report can take many forms and include a variety of information. Normally, the open items report will include various labels with amounts or identifiers associated with those labels. For example, labels and their amounts and identifiers typically would pertain to: a voucher number, an invoice number, an invoice date, purchase order number, a voucher amount, balance due, and various totals. FIGS. **9E** and **10D** are exemplary screen depictions displayed by an Internet browser application on the client machine. More particularly, FIG. **9E** is an exemplary data entry screen for an open items report, and FIG. **10D** is an exemplary open items report.

FIGS. **8A** and **8B** are flow diagrams of check report processing **800** according to an embodiment of the invention. The check report processing **800** produces a check report for a particular check. In one embodiment, the check report processing **800** is performed by the server machine.

The check report processing **800** initially receives **802** a check report request from the Internet browser application on the client machine via the Internet. Next, the return data channel and the database are opened **504** and **506** as previously discussed. The check report request is then parsed **804** to obtain a check number, a vendor identifier, and a hidden vendor identifier. Next, a vendor identifier associated with the check number is retrieved **806** from a check file of the database on the corporate financial computer.

A decision block **808** then determines whether the check exists. Here, if the check number provided in the check report request is not found in the check file, then the check does not exist. When the check does not exist, an error message is transmitted **810** to the Internet browser application on the client machine. In this case, the error message indicates that the check is not on file. Following block **810**, the check report processing **800** is complete as the check report is not available to the requester, and processing returns to block **122** of the information accessing **100**. In this case, the block **122** of the information access processing **100** will not display the desired report but will instead display the error message.

On the other hand, when the decision block **808** determines that the check does exist, the decision block **516** determines whether the retrieved vendor identifier matches both the vendor identifier provided with the report request and the hidden vendor identifier. When the vendor identifiers do not properly match, an error message is transmitted **812** to the Internet browser application of the client machine. The error message in this case indicates that the check does not exist. In other words, the requester of the check report is not permitted to receive such a check report because the vendor identifier associated with the check on which the report was requested does not belong to the vendor identifier that has been authorized to access the account information during the login process. Following the block **812**, the check report processing **800** is complete and processing returns to block **122** of the information access processing **100** where the error message is displayed.

Alternatively, when the decision block **516** determines that the vendor identifiers do properly match, then processing continues to produce the check report. In particular, check information is then retrieved **814** from the check file. As an example, the check information can include: a check date, a cancel date, a check status, and a check amount. Further, voucher information may be retrieved **816** from the voucher file. Then, the retrieved information is formatted **818** into a check report. Once the check report has been formatted **818**, the check report is transmitted **820** to the Internet browser application on the client machine via the Internet. The database is also closed **530** as previously described. Following block **530** in FIG. **8B**, the check report processing **800** is complete and processing returns to block **122** of the information access processing **100** where the desired report, namely the check report, is displayed.

A check report can take many forms and include a variety of information. Normally, the check report will include various labels with amounts or identifiers associated with those labels. FIGS. **9D** and **10B** are exemplary screen depictions displayed by an Internet browser application on the client machine. More particularly, FIG. **9D** is an exemplary data entry screen for a check report, and FIG. **10B** is an exemplary check report.

Other reports can similarly be formed by processing similar to the processing discussed above with reference to FIGS. **5A–8B**. Examples of other reports include a purchase order report and a combined vouchers and payables report. FIG. **9F** is an exemplary data entry screen for a purchase order report.

The reports produced by invention may also include hyperlinks to other associated account information. In one embodiment, these hyperlinks are indirectly requests for other reports. For example, in FIG. **10A**, the invoice report includes hyperlinks to the associated invoice and the associated check, with the hyperlinks being indicated by underlining. If the requester were to "click" on the check number "2772613" (a hyperlinked value) displayed in the invoice report shown in FIG. **10A**, then in effect a request is made for a check report for that check number. Hence, the result would be the check report such as illustrated in FIG. **10B**. Similarly, if the requester were to "click" on the voucher number "4124693" (a hyperlinked value) displayed in the invoice report shown in FIG. **10A**, then in effect a request is made for a voucher report for that voucher number. Hence, the result would be the voucher report such as illustrated in FIG. **10C**.

The account information from the business entity concerning vendors or suppliers that is contained in the reports produced and displayed to the requester can be downloaded and then imported into a spreadsheet. The downloading is facilitated by the Internet browser application, and the importing is facilitated by a spreadsheet application program.

The invention can also provide electronic notifications to vendors or suppliers that certain invoices are to be paid shortly or on a particular date. In one embodiment, the electronic notification is provided by an electronic mail message that can be manually or automatically sent to a predetermined electronic mail address after it is determined when payment of an invoice is to be made. This advance notification allows vendors or suppliers to pre-post their receivables and thus provide a cash forecast. In one embodiment, the electronic mail messages are produced by a notification program running on the corporate financial computer. The notification program searches for newly created checks to be issued (i.e., deposited) to vendors or suppliers shortly (e.g., in two business days), and for those checks that are found sends a electronic mail message to the electronic mail address on file from to the associated vendors or suppliers.

The advantages of the invention are numerous. One advantage of the invention is that the man power required to service incoming inquiries from vendors or suppliers regarding payment of their invoices is substantially reduced. Another advantage of the invention is that the account information is the actual or "live" account information of the business entity. As a result, the vendors or suppliers access account information that is always current. Another advantage of the invention is that vendors or suppliers are able to access account information of the business entity to determine the payment status of their invoices. Still another advantage of the invention is that the account information from the business entity concerning vendors or suppliers can be downloaded and imported into a spreadsheet. Yet another advantage of the invention is that a vendor can be electronically notified of the payment of an invoice prior to funding their account with said payment.

The many features and advantages of the present invention are apparent from the written description, and thus, it is intended by the appended claims to cover all such features and advantages of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation as illustrated and described. Hence, all suitable modifications and equivalents may be resorted to as falling within the scope of the invention.

What is claimed is:

1. A method for enabling a vendor to access accounts payable information from a business entity financial computer over the Internet, said method comprising:

(a) requesting, by a vendor client machine, access to an Internet server machine, the client machine and the Internet server machine being coupled to the Internet, and the Internet server machine having a secure connection to the business entity financial computer;

(b) determining whether access is authorized;

(c) displaying, at the client machine, an information selection screen offering a plurality of different report types of accounts payable information when access is determined to be authorized, wherein said displaying (c) of the information selection screen comprises:

(c1) retrieving a template for the information selection screen;

(c2) producing an information selection page from the template and predetermined configuration information for the account; and

(c3) transmitting the information selection page to the client machine as the information selection screen;

(d) selecting one of the different report types of accounts payable information;

(e) displaying a data entry screen for the selected report type;

(f) entering data for the selected report type using the data entry screen being displayed;

(g) transmitting, to the server machine, a request for the selected report type in accordance with the data entered;

(h) extracting, at the server machine, the requested accounts payable information from the business entity financial computer over the secure connection;

(i) producing a report of the selected report type from at least a portion of the extracted accounts payable information;

(j) forwarding the report produced from the server machine to the client machine; and

(k) displaying, at the client machine, the report forwarded from the server machine, wherein said requesting (a), said selecting (d) and said entering (f) are operations performed by a requester, and wherein said displaying (c) further comprises:

(c4) embedding a hidden requester identifier into the information selection page before said transmitting (c3).

2. A method for enabling a vendor to access accounts payable information from a business entity financial computer over the Internet, said method comprising:

(a) requesting, by a vendor client machine, access to an Internet server machine, the client machine and the Internet server machine being coupled to the Internet, and the Internet server machine having a secure connection to the business entity financial computer;

(b) determining whether access is authorized;

(c) displaying, at the client machine, an information selection screen offering a plurality of different report types of accounts payable information when access is determined to be authorized, wherein said requesting (a) is initiated by a requester at the client machine, and wherein the information selection screen tat is displayed by said displaying (c) includes a hidden identifier embedded therein, the hidden requester identifier is the requester identifier that has been authorized for access bay said determining (b);

(d) selecting one of the different report types of accounts payable information;

(e) displaying a data entry screen for the selected report type;

(f) entering data for the selected report type using the data entry screen being displayed;

(g) transmitting, to the server machine, a request for the selected report type in accordance with the data entered;

(h) extracting, at the server machine, the requested accounts payable information from the business entity financial computer over the secure connection;

(i) producing a report of the selected report type from at least a portion of the extracted accounts payable information;

(j) forwarding the report produced from the server machine to the client machine; and

(k) displaying, at the client machine, the report forwarded from the server machine.

3. A method as recited in claim 2, wherein said transmitting (g) transmits the hidden requester identifier together with the request.

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